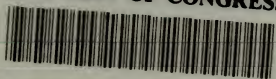


LIBRARY OF CONGRESS



00015171881





YOUNG SAILOR'S ASSISTANT

IN

PRACTICAL SEAMANSHIP

INCLUDING THE

RULES OF THE ROAD; DIRECTIONS FOR RESUSCITATING
THE APPARENTLY DROWNED, ETC., ETC.,

TOGETHER WITH THE

SALUTES AND ETIQUETTE ON BOARD A MAN-OF-WAR; THE
GENERAL SERVICE CODE AND HOMOGRAPHIC CODE OF
SIGNALS; THE CAUTIONARY WEATHER SIGNALS;
WITH COLORED PLATES OF FLAGS OF ALL
NATIONS, NAVAL SIGNAL FLAGS,
NAVY'S LIGHTS, AND THE
INTERNATIONAL CODE
OF SIGNALS,

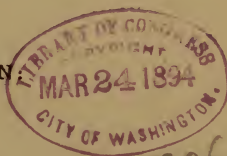
BY

LIEUT. EMORY H. TAUNT, U. S. NAVY.

"

THIRD EDITION.

WASHINGTON
1893.



15906 Z

VA 541
T23

Entered according to Act of Congress, in the year 1883, by
EMORY H. TAUNT, U. S. N.,
In the Office of the Librarian of Congress, at Washington.

RESPECTFULLY DEDICATED
TO
REAR ADMIRAL R. W. SHUFELDT, U. S. N.,
TO WHOSE EFFORTS THE SERVICE IS INDEBTED
FOR THE PERMANENT ESTABLISHMENT
OF THE NAVAL TRAINING SYSTEM.

NAVY DEPARTMENT,
BUREAU OF EQUIPMENT AND RECRUITING,
WASHINGTON, *June 1st, 1883.*
LIEUTENANT EMORY H. TAUNT, U. S. NAVY.

Navy Department.

SIR: A Board of Officers, formerly connected with the Training System, having examined and favorably recommended your "Young Sailor's Assistant," the work is approved and adopted by the Bureau as an aid in the instruction of Naval Apprentices.

Very respectfully, your obedient servant,

EARL ENGLISH,
Chief of Bureau.

PREFACE.

The object of this work is to present a simple, practical seamanship for the use of the "young sailors" of the Navy; and through it, if possible, to bring about a uniformity of instruction among the Naval Apprentices, the necessity of which has long been felt by those who have been connected with the Training System.

I trust the work, in its simple way, will not only prove an assistant to the young sailor, but will also be of service to the Instructors by suggesting questions and answers that might not otherwise occur to them.

Everything obsolete, so far as practicable, has been omitted, and the work has been confined to the manner of rigging and fitting vessels of the present day.

I have consulted and made extracts from Luce's *Seamanship* (ed. 1877), Nare's *Seamanship*, Qualtrough's *Sailors' Handy Book*, The Boys' Manual, by Commander C. Burney, R. N., Hammersley's *Naval Encyclopædia*, and the *Equipment Allowance Book*, and I have been greatly assisted by the advice of Commodore Earl English, U. S. Navy, Lieutenant A. P. Nazro, U. S. Navy, and Boatswain C. E. Hawkins, U. S. Navy. I am indebted to Chief Constructor T. D. Wilson, U. S. Navy, for the use of the Bureau's drawings of the hull and spars of the "Lancaster," and other vessels.

EMORY H. TAUNT, *Lieutenant, U. S. N.*

NAVY DEPARTMENT,
Washington, D. C., 1883.

CONTENTS.

SIGNALS.

General Service Code,*Day and Night Signals—Homographic Code,
Day and Night Signals—Examples, etc., etc. pp. 5-15

SALUTES.

Etiquette on board a Man-of-War—Boat Salutes—Special Salutes of
Coxswains, etc., etc. pp. 26-29

CHAPTER I.

Bags—Clothing—Hammocks—Messcs—Slinging Hammocks—Lash-
ing Hammocks—Cleaning Hammocks—Care of Clothing—
Watches—Bells for Denoting Time on Board Ship—Formation
of Messcs—Ration Money—Rations, etc., etc. pp. 30-39

CHAPTER II.

Rigs of Vessels—Men-of-War, how Classcd—Names of Masts, Yards
and Sails—Names of the Parts of a Ship, the Fittings, etc., etc.,
pp. 40-63

CHAPTER III.

Names of the parts of Masts, Bowsprit, Yards and Sails—Gaskets—
Reef Earrings—Head Earrings—Back Cloths—Securing Sails to
Yards and Stays—Awnings—Ridge Ropes, etc., etc. . . pp. 64-83

CHAPTER IV.

Standing Rigging—Shrouds—Stays—Backstays—Head Rigging—
Gammoning—Laniards of Rigging—Dead Eyes—Hearts—Sheer
Poles—Ratlines—Fittings for Yards—Jacob's Ladders, etc.,
pp. 84-90

CHAPTER V.

Marline—Spike Seamanship—Knots—Splices—Bends—Hitches—
Clinches—Seizings—Worming—Parcelling—Serving—Slings—

CONTENTS.

Pointing Ropes—Whipping Ropes—Sennit—Round, Square, French Sennit, etc.—Mats, etc., etc. pp. 90-115

CHAPTER VI.

Boats—Parts of a Boat—Catamaran—Oars—Lowering and Hoisting Boats—Orders Used by Persons in Charge of Boats—Towing Boats—Gripes—Securing Boats for Sea—Beaching Boats—General Remarks, Applied to Boats Under Oars and Sails—Duties of Boat-Keepers—Boats Under Sail—Rigs of Boats—Handling Boats Under Sail—Remarks on Boats Under Sail pp. 116-147

CHAPTER VII.

Blocks—Block Straps—Tackles—Common Block—Morticed Block—Different Classes of Blocks—Strapping Blocks—Description of Different Purchases—Rope or Cordage, Different Kinds, How and Where Made, Its Uses, How Preserved—Hawsers, Towlines, Where Stowed, etc., etc.—Wire and Hide Rope, Their Uses—How Protected from the Weather pp. 148-173

CHAPTER VIII.

Compass—Helm—Lead—Log—To Box the Compass—Construction of the Navy Compass—Description of a Tiller—Rudder—Tiller or Wheel Ropes—Leads, when Used—Lead Lines, how Marked, etc., etc.—Logs, What They Consist of, how Marked, when Used—Description of Log Line and Reel—Time Glasses—Taffrail Log Wind—Scale—Cloud Record—Seamen's Proverbs, etc., etc.

pp. 174-210

CHAPTER IX.

General Fittings and Lead of the Standing Rigging—Rigging of Bow-sprit—Lower, Topmast, Topgallant and Royal Rigging—Healey's Patent Splice, for Fitting Rigging—Rigging of Yards, etc., etc.,

pp. 210-224

CHAPTER X.

Rigging Ship—To Step Lower Masts—Send Up Tops—Getting over Lower Rigging—Send up Lower Stays Send up Topmasts—Ship Lower Caps—Rig Topmasts—Ship Topmast Caps—Send up and Rig Lower and Topsail Yards—Rig out Jib Boom—Send up Top-

CONTENTS.

gallant Masts—Rig out Flying Jib-Boom—Cross Top-gallant and Royal Yards pp. 225-243

CHAPTER XI.

Staying of Masts and Setting up Rigging—Staying Masts by Use of Battens—Staying Lower Masts—Setting up Lower Rigging and Lower Stays—Securing Laniards—Mast Wedges—Mast Coats—Swiftering in—Sparring Down—Rattling Down—Snaking Down, etc., etc. pp. 245-251

CHAPTER XII.

Running Rigging—The Uses of Different Ropes—Reeving Gear—Lifts—Foot Ropes—Stirrups, etc.—Miscellaneous—Questions on Purchases, etc. pp. 252-286

CHAPTER XIII.

Bending, Loosing, Furling, Mending Sail, Reefing Sail—Squaring Yards—To Make up Courses and Topsails for Bending—To Bend a Course and Topsail—To Make up and Bend Studding Sails—Loosing Sail to a Bowline—Shorten and Furl Sail—To Mend Sail—Reefing and Turning out Reefs—Unbending Sails, etc., etc., pp. 287-309

CHAPTER XIV.

Making and Reducing Sail, Ropes Used, etc., etc.—Working Studding Sails—Manœuvring, Tacking, Wearing, etc., etc.—General Remarks—Ropes Used in Making and Taking in Sail—In Setting and Taking in Studding-sails—Manœuvring under Various Circumstances—Tacking and Wearing—General Instructions as to Manner of “Making” and Shortening Sail, etc., etc., pp. 309-328.

CHAPTER XV.

Exercising Spars—Shifting Sails—How to Send Topgallant and Royal Yards Up and Down—How to “Rig In” a Flying-Jib Boom—How to Send Down Topsail or Lower Yard—How to Send Down or “Shift” a Topmast—How to Shift a Jib—How to Shift a Topsail and Course in Moderate Weather, and in a Gale, etc., etc., pp. 329-343.

CONTENTS.

CHAPTER XVI.

CAPSTANS, ANCHORS AND CHAINS.

Capstan, How Made and Worked—Anchors and Chain Cables, How and Where Made—Names of Different Anchors in Use, and their Description—Construction and Use of a “Sea Anchor”—How to Tell the Weight of an Anchor or Kedge—Manner of Making and Description of Chain Cables—How they are Marked, and Where Stowed on Board Ship, etc pp. 344-354.

CHAPTER XVII.

Handling Anchors and Chains—Mooring—State of Hawse, etc., etc.—Warping and Kedgeing—Carrying Out Anchors—How Chains are Bent to Bower and Sheet Anchors—Appliances Used in Handling Anchors and Chains—How to Stopper and Bitt a Chain—Description of Cat and Fish Falls, and their Uses—How to “Bring To” a Chain, and Get Ready for Heaving Up Anchor—The Use of Messengers—Anchor Buoys—How to “Moor” a Vessel—How to Clear Hawse—How to Recover an Anchor and Chain if the Cable Parts—How to Carry Out a Kedge or Stream Anchor—How to Carry Out a Bower Anchor—How Warps are Run and Precautions to be Taken with Them when Wet, etc., etc pp. 355-376.

CHAPTER XVIII.

HOISTING IN AND OUT OF BOATS—SECURING YARDS FOR HEAVY WEIGHTS.

How Launches and Other Boats are Hoisted in and out—Use of Triatic Stay—Manner of Securing Yards for Ordinary or Heavy Work, etc pp. 377-382.

CHAPTER XIX.

Preparations for Sea—Life Buoys, etc.—Man Overboard—Cork Jackets—Rules of the Road—Bells to Regulate the Movements of Steamers—How a Vessel is Prepared for Sea—What is Done About the Health Bill and Ship’s Bills—What are Life Buoys—Their Use and How Worked on Vessels of War.—Life Boats—

CONTENTS.

Special Instructions and Additional Rules, Relating to Lights for Inland Waters—Aids to Memory for Rules of the Road—The Buoying of Channels, etc., etc. 383-400

CHAPTER XX.

Cautionary Weather Signals—Stations for the Display of Same—Life Saving Service—Vessels Ashore—Management of Open Boats in a Surf—Instructions for Saving Drowning Persons by Swimming to their Relief—Instructions for Restoring the Apparently Drowned, etc., etc. pp. 401-422

CHAPTER XXI.

Bright Work, Remarks on Cleaning Same—Stowage of Holds—Scraping Spars—Navy Yards and Naval Stations—National Holidays—Dressing Ship—Mourning—Paints, Stains, etc., etc.—Currency Tables pp. 423-436

CHAPTER XXII.

Cutting and Fitting Rigging, as Practiced in a Rigging Loft—Beam Scale, etc., etc.—Preparation and Care of Standing and Other Rigging pp. 437-449

CHAPTER XXIII.

Definitions of Sea Terms, Expressions, etc., etc.—Definitions of Tides
pp. 450-458

ILLUSTRATIONS.

COLORED.

	PAGE.
National ensigns for men-of-war	16-17
National ensigns for mercantile marine	18-19
International code of signals	19
American ensign	20
American union jack	20
American pennant	20
President's flag	20
Flag of the Secretary of the Navy	20
Fleet flags	21
Signal flags and lights	22-24
Lights of vessels as seen at night	25
Signal Service Distinctive Flag	401
Signal Service Number	401
Cautionary Weather Signal	403
Cautionary Off-Shore Signal	404

ILLUSTRATIONS.

NOT COLORED.

	PAGE.
Anchors	346-347
Anchors, carrying out	373
Bowsprit, top and side view of	69
Bends	101-102
Boats, showing evolutions of crew	124-128
Boats, giving and taking a tow	130
Boats, towing alongside of vessel	131
Boat, hauling up on beach	146
Blocks	148-157
Beam Scale	438
Caps, lower and topmast	67
Clinches	103
Compass, and parts of	174-177
Capstan, steam	344
Drowning, rescuing the	416
Dead-eyes, Healy's patent	219-220
Drowned, restoring	418-419
Earing, bull	306
Earing, bull passed with riding turn	306
Earing head, passed	290
Gammoning	86
Garland and lashing	225
Hammock, properly slung	31
Hammock, hitches	32
Hitches	97-100

Hooks	104
Hawsers	170
Hawse, foul	367-368
Jack and funnel	68
Jib-boom, side view of	69
Knots	93-97
Ladders, Jacob's	89
Lead, deep sea	198
Log chip	202
Log reel	203
Log, taffrail	205
Masts—	
Lower mast, section of	64
Lower and topmast, doublings of	65
Lower mast, staying of	245
Mats	114-115
Mooring swivel	369
Rigs, sea-going vessels—	
Ship	41
Barque	43
Barquentine	43
Brig	41
Brigantine	42
Hermaphrodite brig	42
Double-turretted monitor	44
Topsail schooner	44
Fore-and-aft schooner	45
Sloop	45
Four-masted ocean steamer	45
Ropes	170
Rudder, section of vessel showing	188
Ratlines	248
Rigging, setting up lower	247
Rigging, setting up topmast	251

Signals, Fog	387
Signals, general service code	6
Signals, homographic code	11
Sails —	
Course	75
Topsail	75
Topgallant sail	75
Jib	81
Spanker	81
Slings	104
Splices	105-109
Seizings	110-114
Sennit	114-115
Steering-gear, steam	186
Stranded vessel, establishing communication with shore	406
Screw, section of vessel showing	188
Sockets, metallic	221-222
Snaking down	251
Strap and toggle for laniards	246
Top, for-and-aft view of	71
Tackles	158-166
Time-glass	204
Tops, sending up whole	226
Tops, sending up half	228
Toggle and becket	306
Yards, section of lower and topsail	73

SIGNALS.

The figures on the opposite page will explain the "*First position*." "First motion" (or No. 1), second motion (or No. 2), third motion, (or No. 3).

General Service Code—Army and Navy.

<i>Flag.</i>	<i>Flag.</i>
A 22	N 11
B 2112	O 21
C 121	P 1212
D 222	Q 1211
E 12	R 211
F 2221	S 212
G 2211	T 2
H 122	U 112
I 1	V 1222
J 1122	W 1121
K 2121	X 2122
L 221	Y 111
M 1221	Z 2222

Signalman faces exactly communicating station—flag is held directly above the head—butt of staff at the waist.

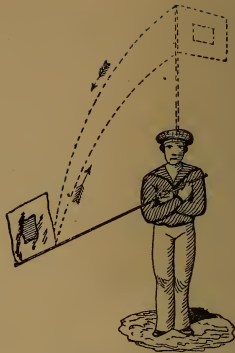
Letters are signalled by making, one after the other, the following motions for the figures standing for each letter. When two or more figures follow each other, there is no pause between the motions of the figures :

To make "one" [1] flag is waved to ground on right side, and brought back above the head.

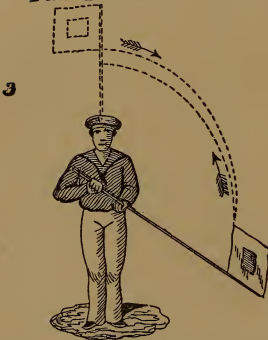
To make "two" [2] flag is waved to ground on left side, and brought back above the head.



First Position.



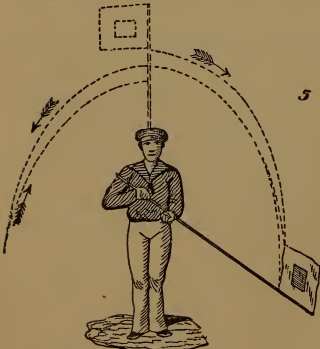
First Motion—"One"—"1"



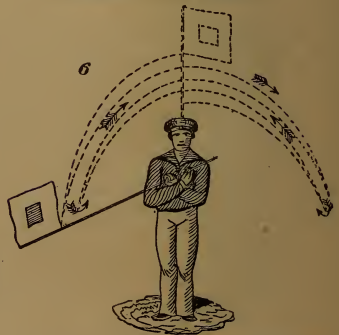
Second Motion—"Two"—"2"



"Three"—"3"—or "Front."



"Two - One"—"21."



(6) "One-Two-One-Two"—"1212."

To make "three" [3] or FRONT, flag is waved to ground in front, and brought back above the head.

So to make "A," or "twenty-two" [22], the flag is waved twice to the ground to the left without any stop between the motions—so for a number of "twos" following each other.

To make "N" [11], "one" "one," (as above).

To make "B," or "twenty-one twelve" [2112], the flag is waved to the ground, "left—right—right—left."

To make "K," or "twenty-one twenty-one" [2121], the flag is waved to the ground, "left—right—left—right."

To make "three" [3] flag waved FRONT, to make "thirty-three" [33]—FRONT—FRONT. Error—212121. Repeat—121-121-121-3. Assent—22-22-22-3. End of word, 3. End of sentence, 33. End of message, 333. Cease signaling—22-22-22-333.

Move a little to the right, 211-211-211-3.

Move a little to the left, 221-221-221-3.

"Attention, look for signals from this point." Wave the flag successively from side to side until attention is attracted.

In a squadron, each vessel has its own particular letter to distinguish it when being called for signals, for example: The Flag-ship is usually "F," the "Portsmouth" "P," "Saratoga" "S," etc., etc.

The flag is always above the head at the end of each letter.

Nos.

Numerals.

1. 21112 also means, Wait a moment.
2. 12221 " " Are you ready?
3. 22122 " " I am ready.
4. 22212 " " Use short pole and small flag.

- | | | | | |
|----|-------|---|---|-------------------------------|
| 5. | 22221 | “ | “ | Use long pole and large flag. |
| 6. | 12222 | “ | “ | Work faster. |
| 7. | 11222 | “ | “ | Did you understand? |
| 8. | 11112 | “ | “ | Use white flag. |
| 9. | 11211 | “ | “ | Use black flag. |
| 0. | 22222 | “ | “ | Use red flag. |

Abbreviations.

A—after, b—before, c—can, h—have, n—not, r—are, t—the, u—you, ur—your, w—word, wi—with, y—why.

Night Signals.

A lighted torch or lantern (*foot light*) is placed in front of, and at the feet of the signalman. Another light fastened at the end of a staff, is waved with precisely the same motions as those for the flag in the day.

TO SEND A MESSAGE.

General Service Code.

First call attention by waving the flag successively from side to side, until it is answered by the opposite station, or make a vessel's signal letter until answered.

The answer will be 22-22-22-3, which is the general signal for assent, to signify that they are ready to receive the message. The communicating vessel or station then answers 22-22-22-3 signifying, “I see you are ready to receive the message,” and then proceeds to signal the message *letter by letter*. A pause is made at the end of each letter, *with the flag at “first position,”* (see fig.).

At the end of *each word* the flag is waved to the feet directly in front (3d motion “3”), to show the word is finished. At the end of each sentence there is a pause, and the flag is waved directly to the front twice (“33”)

to show that the sentence is finished. At the end of a message the flag is waved to the ground three times directly in front ("333") showing that the message is finished.

When the signal 333 "end of message" is made, it indicates, "My communication is complete, and await your answer." The person receiving the message will, upon noticing the signal, "message complete," if the message is understood, answer with the signal, "I understand," 22-22-22-3. If, however, the message or any part of it is not understood, the person receiving will make the signal for "*Repeat*," 121-121-121-3, after or before the word, (here signal the word after or before which the repeat is required). If no part of the message is understood, the signal "Repeat" is simply made alone as 121-121-121-3. In commencing a repetition of a signal, the sender will always commence by making the signal of "assent" or "I understand," 22-22-22-3, to show that the call for "repeat" is understood.

The "signal of assent" or "I understand" must be used at the commencement of all communications.

If in sending a message a mistake is made, make the error signal, 21-21-21-3. The sender then beginning with the letter in which has been the error, signals it correctly and proceeds with the message. Signal slowly and distinctly; do not attempt a too hurried way of making the letters, for confusion will follow and many repetitions be necessary.

The Roman letters may be used instead of the numeral characters 1, 2, 3, 4, etc., etc., for example; iv (or 1-1222) would stand for numeral 4, etc., etc.

A simple, convenient method is to use the first ten letters of the alphabet to represent the numerals, for example; A

(22) would stand for numeral 1. B (2112) would stand for numeral 2. C (121) would stand for numeral 3, etc., etc., etc. And to make 365 signal C. F. E. To make 123 signal A. B. C. To make 10 signal A. J. To make 12, signal A. B. To make 42, signal D. B., etc., etc.

When numerals occur in messages, and it is desired to send them in *figures* instead of *words*, the following signal will be made to indicate that numerals follow.

The flag being in the first position is dropped directly to the front, and then moved in a horizontal plane to the right until it reaches a point at right angles with the line of work, when pass it vertically over the head to a corresponding position on the left, then bring it to the front horizontally and return it to the first position.

The signal for "numerals ended" is made in the same manner, only reversing the movements. These signals should always precede and follow numerals.

The signal for the "*address of the message*" is made thus: The flag being in the first position is dropped to the front, and then waved *twice* as above described, in full circles *to the right*, passing vertically over the head, then resuming the first position.

The signal for the "*signing of the message*," is made thus: The flag being in the first position is dropped to the front, and then waved as before described *in full circles twice to the left*, passing vertically over the head, then resuming the first position.

The "General Service Code" is intended to be used for general communication between different parties on land, or between vessels, or between vessels and parties on land. It is for the purpose of transmitting such messages only as may constantly occur in service, and concerning which it



"READY"



1



2



3



4



5



6



7



8



9



0

does not matter whether they are interpreted by the enemy or not.

Ciphers to be agreed upon by the different commanders, must always be used in the transmission of messages of importance, or for any communication which might give information to an enemy.

HOMOGRAPHIC SIGNALS.

There are for these signals one position and ten motions, (see figs. for position "ready," and motions from 1 to 0).

The signalman is equipped as follows: He holds in each hand a disk of canvas, one foot or eighteen inches in diameter, stretched upon a circle of strong wire, and having attached a handle for convenience of management. This handle may be of size only sufficient to be grasped by the hand, or it may be, to give greater distinctness to the signals, say two feet in length. Being thus equipped, take the first position of "*ready*," stand holding a disk in each hand, with the disks held together, and at the height of the breast.

To make the *first motion* or "one," the right hand and disk are extended obliquely upward above the head, at arm's length, and on the right side, then returned to the first position.

To make the *second motion* or "two," the right hand and disk are extended horizontally, and at arm's length on the right side, then returned to the first position.

To make the *third motion* or "three," the right hand and disk are extended obliquely downward, at arm's length, and on the right side, then returned to the first position.

To make the *fourth motion* or "four," the *left* hand and disk are extended obliquely upward, at arm's length, and on the left side, then returned to the first position.

To make the *fifth motion* or "five," the left hand and disk are extended horizontally, at arm's length, and on the left side, then returned to the first position.

To make the *sixth motion* or "six," the left hand and disk are extended obliquely downward, at arm's length, and on the left side, then returned to the first position.

To make the *seventh motion* or "seven," both hands and disks are extended obliquely upward above the head, at arm's length on both sides, then returned to the first position.

To make the *eighth motion* or "eight," both hands and disks are extended horizontally, at arm's length, on both sides, then returned to the first position.

To make the *ninth motion* or "nine," both hands and disks are extended obliquely downward, at arm's length, on both sides, then returned to the first position.

To make the *tenth motion* or "cipher," both hands and disks are held together at arm's length above the head, one disk covering the other, then returned to the first position.

The General Service Homographic Alphabet is as follows:

A . . 11	F . . 12	K . . 13	P . . 14	U . . 15
B . . 21	G . . 22	L . . 23	Q . . 24	W . . 25
C . . 31	H . . 32	M . . 33	R . . 34	X . . 35
D . . 41	I . . 42	N . . 43	S . . 44	Y . . 45
E . . 51	J . . 52	O . . 53	T . . 54	Z . . 55
		V . . 16		

Numerals.

1—1	4—4	7—7	
2—2	5—5	8—8	0—0
3—3	6—6	9—9	

3—End of a word.

33—End of a sentence.

333—End of a message.

22-22-22-3, The signal of assent, or I understand, is to be used with the disks as with the flags.

22-22-22-333—Cease signalling.

121-121-121-3—Repeat.

21-21-21-3—Error.

211-211-211-3—Move a little to the right.

221-221-221-3—Move a little to the left.

To attract attention, wave the disk from side to side, or make vessel's signal letter.

Abbreviations.

A—after, b—before, c—can, h—have, n—not, r—are, t—the, u—you, ur—your, w—word, wi—with, y—why.

If it happens that the signals for numbers are to be used in a message, a *wave* of the disk must be made in the beginning and at the end of the completed number, to clearly distinguish the numeral signals from the letter signals.

Each numeral letter is indicated by a single motion; thus to make 293, but three motions are needed.

NIGHT SIGNALS.

Fasten a *red* lantern at the waist, use a *white* lantern held in the hands.

Same motions and positions for signals as those given in the day.

The figures for any signals in Boat Code or Naval Signal books, can be made as above.

Examples in Homographic Signals.

To make the letter S “44,” the left hand and disk are extended slowly obliquely upward, at arm's length, and on

the left side, and returned to the first position, thus making the signal "four;" repeat this at once in the same manner, thus making "four" again. There is thus made the signal "44," or the letter "S."

To make the letter "*H*" or "32," the right hand and disk are extended slowly obliquely downward at arm's length, and on the right side, then returned to *first position*, thus making the signal "3." Then without pause, the right hand and disk are extended slowly horizontally at arm's length and on the right side, then returned to the first position, thus making the signal "2." Pause. There has thus been made 32, or the letter "*H*." And so on, spelling out the words of the message.

In addition to the system of signals already explained, there are "flash lights" at night, signals by sound, long distance signals, such as manipulating the sails of a vessel, or hoisting objects at the yard arms or mast head to represent numbers, etc., etc.

NATIONAL ENSIGNS FOR MEN OF WAR.



ENGLAND.



FRANCE.



GERMANY.



RUSSIA.



AUSTRIA.



SPAIN.



ITALY.



TURKEY.



EGYPT.



BELGIUM.



HOLLAND.



GREECE.



PORTUGAL.



DENMARK.



NORWAY.



SWEDEN.

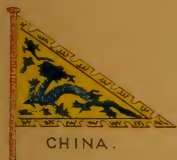


ROUMANIA.

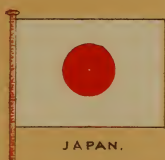


PERSIA.

NATIONAL ENSIGNS FOR MEN OF WAR.



CHINA.



JAPAN.



BRAZIL.



MEXICO.



CHILI.



PERU.



BOLIVIA.



VENEZUELA.



EQUADOR.



PARAGUAY.



URUGUAY.



HAITI.



SAN DOMINGO.



ARGENTINE REPUBLIC.



COREA.



SIAM.



MOROCCO.



SANDWICH IS.

NATIONAL COLOURS FOR MERCANTILE MARINE .



ENGLAND.



TURKEY.



FRANCE.



GERMANY.



RUSSIA.



AUSTRIA.



SPAIN.



ITALY.



EGYPT.



BELGIUM.



HOLLAND.



GREECE.



PORTUGAL.



DENMARK.



NORWAY.



SWEDEN.



BRAZIL.



PERU.

NATIONAL COLOURS FOR MERCANTILE MARINE.



HAITI



CHILI



TUNIS & TRIPOLI.



GUATEMALA



ARGENTINE REPUBLIC



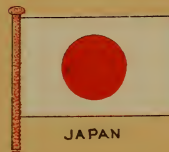
COSTA RICA



SAN DOMINGO



MEXICO



JAPAN

INTERNATIONAL CODE



Code Signal & Answering P.
When used as Code Signal, to be
hoisted under the Ensign
For Answering Pendant where best seen

B



Torpedo Vessels

C



Yes Assent

D



No Negative

F



G



H



J



K



L



M



N



P



Q



R



S



T



V



W



Ensign.

*A Star for every
State.*



Union Jack.

*A Star for every
State.*



*To be worn at the Fore as a signal for a Pilot, at the Mizzen
as a signal that a Court Martial is in session.*

Pennant.



*To be worn by Commanders of all single vessels,
and in the bows of their boats.*



President's Flag.



Flag of the Secretary of the Navy.

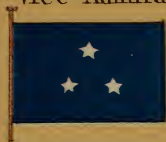
To be worn at the Main, and in the bows of boats.

FLEET FLAGS.

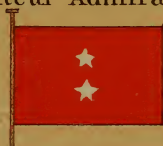
Admiral.



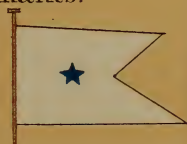
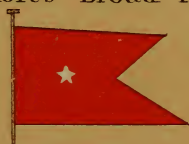
Vice Admiral.







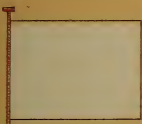

















Rear Admirals.



Commodores' Broad Pennants.

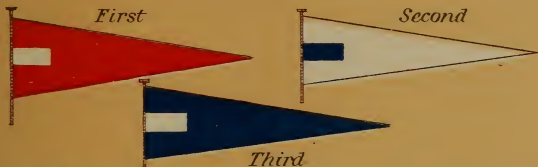


SIGNAL FLAGS AND LIGHTS.

FLAGS	VERY'S LIGHTS	FLAGS	VERY'S LIGHTS
			
1	1	7	7
			
2	2	8	8
			
3	3	9	9
			
4	4	0	0
		<p>Cornet</p> 	Rocket at night in place of Cornet
5	5		
			To be Carried at the fore
6	6	Guard or Guide Flag.	

SIGNAL FLAGS AND LIGHTS.

REPEATERS.



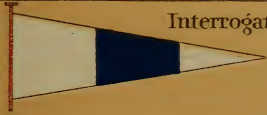
Answering or
Date Pennant.

★ Answering
or "I understand"
★ Repeating
or
"I do not understand"



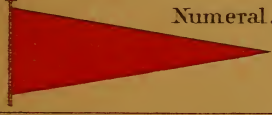
Preparatory.

General Call.
Rocket followed by ★
Message Call.
★ *without Rocket.*



Interrogatory.

I { ★
★ } ★



Numeral.

N { ★
★ } { ★
★ }

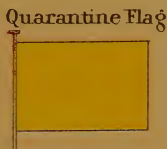


Geographical Pennant.

2 Rockets
Geo. in
succession.



Despatch Flag

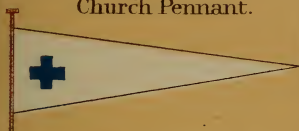


Quarantine Flag

To be carried when authorized by vessels bearing important orders or despatches to or from a Command in Chief, and is not to be stopped or interfered with, except under extraordinary circumstances, for which the Officer will be held accountable.

To be worn by vessels which are placed in Quarantine which are awaiting Pratique, and with which intercourse is forbidden.

Church Pennant.



To be hoisted at the Peak, above the Ensign, during the performance of Divine Service.

General Recall.



Of all Vessels or Boats sent in chase or on service To be hoisted at the fore, and where best seen from other vessels.

Convoy Flag.



Telegraph Flag.



To be displayed at the same time and at the same part of the ship with all Telegraphic signals.

Night Signal.

(Red Star) and a Rocket immediately after the Message Call has been answered.

Danger Flag.



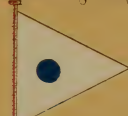
the Compass Signal under which will indicate the bearing of the danger.

Position Flag.



The hoisting of this pennant by a vessel will indicate that she has obtained her proper position. When hoisted by the flag ship to a vessel, it indicates "out of position" or "out of order."

Annulling Flag.



The hoisting of this flag annuls signals being made, or previously made.

At Night: Danger or Distress ★ made and repeated as a "Call" without the Rocket.

Wing Flags.

Right Wing.



Left Wing.



Powder Flag.



Red Flag of Signal Code.

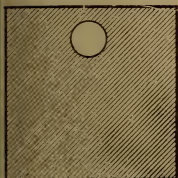
To be hoisted at the fore or where best seen from other vessels, when taking in or discharging powder.

Flag of Truce.

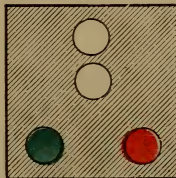


White Flag of Signal Code.

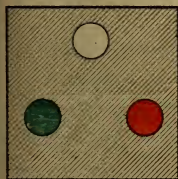
Lights of Vessels as seen by Lookouts.



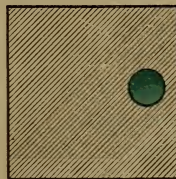
Vessel at anchor
or
Vessel overtaken
by another.



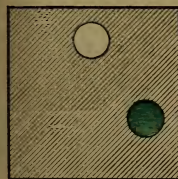
Steam Vessel
with another
vessel in tow.
BOWS ON.



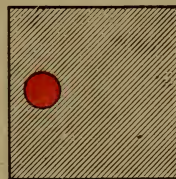
Steam Vessel
under way.
BOWS ON.



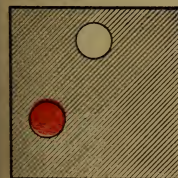
Sailing Vessel
moving towards
the RIGHT.



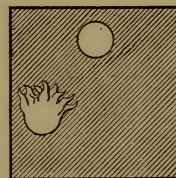
Steam Vessel
moving towards
the RIGHT.



Sailing Vessel
moving towards
the LEFT.



Steam Vessel
moving towards
the LEFT.



Pilot Vessel on
Pilotage duty.
A flare-up at short
intervals which
shall never exceed
15 minutes.

SALUTES.

All commissioned and warrant officers must be saluted when met or spoken to, either on board ship, in a boat, or on shore.

The customary salute in passing or speaking to an officer, is made by *touching* the cap with the right hand, looking him full in the face.

If sitting down and an officer passes, rise, face to the front and salute ; if sitting when addressed by an officer, make the same salute. Should the cap be off, rise and stand at attention. Raising the cap while seated *is not* a proper salute.

When passing an officer, commence the salute a few paces before reaching him, and keep the hand to the cap until you are well past him.

Always salute an officer, either naval or military, when meeting him on shore, in uniform or not ; even if a long distance off and not looking towards you, so long as you can see that he is an officer make the proper salute.

There can be no excuse for *not seeing* an officer when passing ; it is your duty to keep a sharp lookout, and never allow an officer to pass you without saluting him.

Never salute with hands in pockets.

Never salute with a cigar or pipe in mouth.

Never salute when in ranks without an order from the superior in charge.

Should an officer pass a company of men marching under arms, they are brought to a "carry;" if standing at ease they are brought to an "attention;" the senior non-commissioned officer, if in charge, salutes.

Should an officer pass a company of men marching, without arms, the senior non-commissioned officer, if in charge, salutes.

Always bear in mind that it is *your duty* to pay proper respect to your superiors. Never neglect it, nor attempt to shirk it, but rather go out of your way to perform it.

When coming on the quarter deck from below, from forward, coming on board or leaving the ship, always salute.

The quarter deck is reserved for the commanding officer, executive, officer-of-the-deck, and such other officers as may be called there by their duties.

Never use the starboard side of the quarter deck in port, nor the weather side at sea, unless called there by a superior.

Should you wish to speak to the commanding, executive officer, or officer-of-the-deck, always go to "*the mast,*" salute, and wait there until the officer-of-the-deck can attend to you, and when addressed stand at attention.

"*The mast*" is at the starboard side of the mainmast *in port*, and the weather side *at sea*.

Whenever sent on a message, or moving about decks in obedience to an order, always move on the run.

Be careful to thoroughly understand the message to be conveyed and answer returned.

If sent in search of a person, *known to be on board*, never return and say you can't find him.

The ladders *abaft* the mainmast are for the use of the officers—those *forward* of the mainmast, are for the ship's company.

BOAT SALUTES.

Boat keepers in boats alongside a vessel or landing, must always rise and salute officers, leaving, coming alongside, or passing in boats.

When other boats are leaving or coming alongside the ship, boat keepers should go to the bows of their boats, haul up to the boom, and there salute, standing.

SPECIAL SALUTES OF COXSWAINS.

Coxswains of boats when passing commissioned officers, below the rank of commanding officer, must rise and salute. If passing warrant officers simply salute, without rising.

When passing a commanding officer, they should, in addition to the customary salute, "*lay on their oars*," if under sail, "*let fly the sheets*."

When passing an admiral, vice-admiral, rear admiral or commodore, they should in addition "*toss oars*," if under sail, "*lower the sail*." Single banked boats trail the oars.

Coxswains of loaded boats or boats towing, in passing commissioned officers of all grades, should simply rise and salute. Warrant officers are saluted as before.

They must always return the salute made by passing boats, to officers in their own boat.

Boats' crews must always rise and salute, with the coxswain, when a flag officer comes into the boat. And if not underway, they must rise and salute when a flag officer passes.

Flag officers are the admiral, vice-admiral, rear admirals and commodores.

All foreign officers must be saluted the same as our own officers.

Boats moving in the same direction, an inferior must never pass nor crowd his superior, unless authorized to do so by the superior.

Boats passing in opposite directions, to prevent fouling, port the helm.

Boats approaching the same vessel or landing, an inferior must always yield to a superior.

Never keep a boat at a gangway or landing, thereby preventing the approach of other boats, unless there are orders to do so. Shove off and "lay on oars" abreast the ship. If in a tideway, get permission to make fast to a boom pendant or stern ladder.

Coxswains of boats visiting other vessels, must never leave their boats nor allow their crews to do so, except by permission of the officer-of-the-deck.

Side boys are detailed to "*attend the side*;" when commissioned officers are coming on board or leaving the ship, they must touch the cap when the officers are piped over the side.

Nothing will add more to the good credit of a ship than a respectful, well-behaved crew afloat and on shore; but should a ship's company become careless and neglectful in paying the proper respect to their superiors, it will invariably bring discredit on their ship and on themselves.

CHAPTER I.

BAGS—HAMMOCKS—CLOTHING—MESSES, ETC., ETC.

After being shipped in the navy an apprentice is watched, stationed, messed and berthed; his bag, hammock, and outfit of clothing are served out to him.

Where is the outfit stowed?

In the regulation black bag, each piece being brushed and rolled up before stowing. The mattress and blankets stow in the hammock.

How are the bags marked, and where stowed?

They are marked with the owner's name and ship's number, and are stowed in the bag-rack on the berth deck. The bags are in charge of the master-at-arms, and must not be opened except at stated hours, without special permission of the officer-of-the-deck; such permission should always be reported to the master-at-arms or ship's corporal. Each apprentice is allowed one bag and a small box, called "ditty box."

How are hammocks marked? Where stowed?

With the watch number, outside, on the head of the hammock, starboard watch in black, port watch in red. They are stowed in hammock nettings on the spar deck, port watch, on the port side, starboard watch, on the starboard side, forecastle men, fore and main topmen in forward nettings, afterguards, mizzen topmen, idlers and marines in

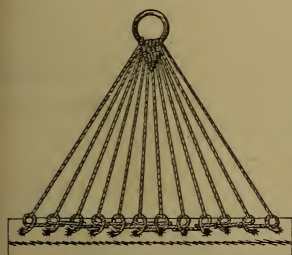
the after nettings. Each apprentice is allowed two hammocks; one he sleeps in, the other being stowed below in charge of the sail-maker until needed.

What are hammock clews?

A collection of small lines called nettles, hitched to a small metal ring. The clews are made fast to each end of the hammock.

How is a hammock slung?

Hook the ring of the clews to a hammock hook, pass each outer nettle through the outer eyelet hole on its own side of the hammock, square these two nettles and take a



A PROPERLY SLUNG HAMMOCK.

half hitch with each; then take the nettles next to the outer ones, and pass them through the next eyelets from the ends, square and hitch as before, and so on, *being careful to expend or tuck the end of each nettle through the half hitch following it, so that no ends will be exposed when the hammock is lashed.* One end being finished, sling the other end in the same manner.

What is a hammock laniard? Its use?

A piece of small line spliced to the ring of the clews, (the end being whipped to prevent unlaying) and is used to assist in swinging the hammock when the clews will not reach comfortably from hook to hook.

What are hammock hooks?

Hooks, screwed into the ship's beams, upon which the hammocks are slung.

What is a sleeping billet?

The hooks designated for a person to sling his hammock on. The watch number is plainly painted above the forward hook; be careful in swinging the hammock not to injure the paint on the beams.

How are sleeping billets distributed?

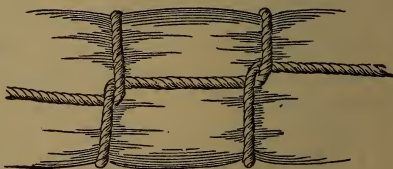
Commence forward with the forecastle men, working athwartships, until well aft, so as to leave an empty hammock on each side of a full one when either watch is on deck. Forecastle men, fore, main and mizzentopmen, etc., etc., in their own parts of the ship. Boatswain's mates close to the hatchways.

What is a hammock lashing? Its use?

A piece of 12 thread manilla rope with an eye spliced in one end, the other end being whipped. It should be long enough to take seven good turns, with plenty to spare. It is used to lash the hammock before stowing.

How do you lash a hammock?

Lay the blankets in neat folds in the centre of the mattress, draw the two sides of the hammock snugly together, and take seven turns or hitches with the lashing equal distances apart, *commencing at the head*



HAMMOCK HITCHES.

(reeving the end of the lashing through the eye for the first turn), after the last or foot hitch, take a round turn around the end, and tuck the lashing neatly along the centre or belly of the hammock. Unhook one end, and with the hammock *under the arm*, twist the clews well and tuck them neatly under the lashing at the belly, hauling

them well taut and beating the end of the hammock well down. *Keep the hammock off the guns and deck.* Proceed in the same manner with the other end, then stow in the proper netting.

Great care should be taken to always have a *well lashed neat looking* hammock to stow in the nettings. This is easily accomplished by being careful to observe the above instructions.

How are hammocks cleaned?

Each person scrubs his own hammock with his own soap. First wet the deck where the hammock is to be scrubbed, then soap and scrub each side of the hammock thoroughly. After being scrubbed and *well rinsed* they are stopped on the hammock gantlings (lines stretched from the jib-boom to the spanker-boom) to dry, starboard watch stopping on the starboard side, port watch on the port side, *numbers up* and *outboard*. Each hammock should be secured to the line by three stops, lap about four inches over and be secured to the foot of the next hammock by footstops.

What is done with the hammocks after drying?

They are taken from the line after being piped down (lowered to the deck), and are turned in to the sailmaker at the next muster at quarters, the hammocks of each gun's crew forming separate bundles.

What is "airing bedding?"

Once a week, weather permitting, the hammocks are taken out of the nettings and unlashed, the bedding spread out, one turn of the lashing is then taken around the middle of the hammock and bedding, the whole being triced up in the rigging to air, forecastle men and foretopmen in the fore rigging, maintopmen and afterguards in the main rigging, mizzentopmen, marines, etc., in the mizzen rigging, care being taken not to pass lashings around ratlines.

What is done with clothing when served out ?

Each piece after being tried on, is to be plainly marked with the owner's name *in full on the inside*, not where it will show while being worn. Each wash piece to have *permanent clothes stops made fast to it*, these stops to be long enough to tie on the clothes-lines with end to spare.

How are clothes washed ?

Scrubbed on deck with soap and brushes, well rinsed and wrung out, then stopped on the clothes-lines to dry. White clothes are kept separate from the blue, and are to be stopped on above them, so that drippings from the blue pieces will not soil the white.

What is done the night before scrubbing clothes ?

Soap and brushes are prepared, and *all soiled clothing* should be stowed in the top of the bag so that it can be reached without delay.

What is done the night before scrubbing hammocks ?

Clean hammocks are served out at quarters and afterwards slung, soap and brushes are prepared to scrub the dirty hammocks the next morning.

How is bedding inspected ?

Hammocks are piped down, taken to quarters, unlashed, and the hammock and bedding laid on the deck athwartships, blankets folded and placed on the foot of the mattress, all being exposed so the inspecting officer can see, plainly, their condition.

How are bags inspected ?

The bags are piped up and taken to quarters, everything is taken out, the bag flattened and laid on the deck, to arrange the clothes upon and keep them from being soiled. Take each piece, brush it well, roll it up carefully with the *marking out*, and stop it with clothes stops, one stop at

each end of the roll, then arrange the pieces on top of the bag in two rows, keeping the white and blue separate. When everything is ready for inspection, stand in rear of the clothing and wait for the inspecting officer.

Every apprentice should take pride in having a clean, well kept bag, and never miss a wash morning when he has soiled clothes; no matter how cold it is, if others can wash, he can. Keep all clothing mended. Be very particular about the person, take off the underclothing every day, and *brush the seams out thoroughly*. Wash to the waist every morning before decks are dried down, and wash all over, *at least*, once a week. By observing these rules he will not find it difficult to keep both clothing and person neat and clean.

Shift into the uniform of the day during breakfast hour, and shift back again into such uniform as may be ordered, during the supper hour, and *not before* unless otherwise ordered.

WATCHES.

How are the ship's company divided?

Into two watches—starboard and port. Each watch is divided into two parts, 1st and 2d part. Odd numbers always make up the starboard watch, even numbers the port. The watches are composed of the chief petty officers, boatswains' mates, quartermasters, forecastlemen, fore, main and mizzentopmen, afterguards, idlers and marines.

How are the different watches distinguished?

A piece of white tape is sewed on the sleeve of the blue frock, a piece of blue stuff on the sleeve of the white frock and working jumper, on the right arm for the starboard watch, on the left arm for the port watch. Great care should be taken to have proper watch marks on all frocks.

The principal petty officers wear the following marks of distinction: All petty officers wear on the right sleeve, above the elbow, an eagle and anchor with a star above it. The master-at-arms has in addition a foul anchor and star on each sleeve. Coxswains to flag officers, wear cross anchors on each end of the collar. Captains' coxswains, wear one anchor in the same place. Quartermasters, wear double glasses on the sleeve. Boatswain's mates, wear a foul anchor. Gunner's mates, wear cross cannon. Captains of forecastle, wear cross anchors. Captains of tops, wear figure-of-eight knots. Carpenter's mates, a broadaxe, and sailmaker's mates, a fid.

How is a ship's company distributed for working and cleaning ship?

Forecastle men on fore yard and head booms, they clean both sides of the forecastle; foretopmen, in foretop, and clean port gangway; maintopmen, in main top, and clean starboard gangway; mizzentopmen, in mizzen top, and clean port side of quarter deck; afterguardsmen, on main yard, spanker, and trysail, they clean starboard side of quarter deck. In port, on board gundeck ships the starboard watch look out for the spar deck, the port watch for the gun deck. The spar deck people clean the ladders leading *from* spar deck. Gun deck people clean the ladders leading to the berth deck. Side and copper cleaners and chain keepers are detailed from the different parts of the ship.

How are the watches divided during the twenty-four hours?

Into seven tours: The afternoon watch is from noon to four, first dog watch from four to six, the second dog watch from six to eight, the first watch from eight to

twelve, the middle watch from twelve to four, morning watch from four to eight, and the forenoon watch from eight to twelve. The dog watches being of two hours' duration and the other watches of four hours, the people of each watch change their tour every twenty-four hours; for example, if the starboard watch has the first watch one night, they will have the middle watch the following night, and so on, giving each watch while at sea, eight hours on deck every other night, and eight hours in their hammocks every other night. Anchor watches are kept in port, a few hands being detailed from each part of the ship. They are relieved every two hours. On foggy and on windy nights they attend the fog-bell and the drift-lead.

How is time denoted on board ship?

By striking the bell as follows—noon, 4 p. m., 8 p. m., midnight, 4 a. m. and 8 a. m., are all eight (8) bells, struck in pairs as II-II-II-II. Commencing at eight bells, each hour and half hour is as follows:

Noon—8 bells struck II-II-II-II.

$\frac{1}{2}$ past 12—I bell “ 1.

1 o'clock—2 bells “ II.

$\frac{1}{2}$ past 1—3 “ “ II-I.

2 o'clock—4 “ “ II-II.

$\frac{1}{2}$ past 2—5 “ “ II-II-I.

3 o'clock—6 “ “ II-II-II.

$\frac{1}{2}$ past 3—7 “ “ II-II-II-I.

4 o'clock—8 “ “ II-II-II-II.

Then commence half past four as one bell, and increase every half hour until eight bells is reached again.

When is a crew at quarters?

When at their stations for muster, preparatory for battle.

How are they stationed?

In divisions, viz.: Master's or Navigator's, powder, and gun divisions—gun divisions being sub-divided into gun's crews to work each gun. The guns are numbered from forward, the odd numbered guns being manned by the starboard watch, the even numbered guns by the port watch. All musters and inspections, except "General Muster" are made at quarters.

How is a crew messed?

In cruising men of war, with regard to the part of the ship to which they belong. In training ships, the apprentices are usually messed by gun's crews. The messes are numbered from forward, Nos. 1, 2, 3, 4, etc., etc., the starboard watch composing the odd numbered messes, the port watch the even numbered. The appointed officers, petty officers, and marines form separate messes.

A mess cook is selected from each mess, which consists usually of sixteen or seventeen persons. He must keep the mess-table and mess-gear clean and in good order, draw all the provisions, do all the cooking that does not belong to the ship's cook, and attend to all the mess work. He must keep his mess-chest ready for inspection at all hours, and assist in cleaning the berth deck. Mess-cooks are under the especial charge of the master-at-arms. They are usually allowed their ration as a compensation for cooking, and are permitted to draw it in money. The navy ration is thirty cents per day.

What is a mess caterer?

A person selected to take charge of the mess money, derived from the stopped rations, etc.; he purchases such extra provisions as the mess may wish to lay in.

What are stopped rations?

Three or four rations are allowed to be commuted or stopped in messes of sixteen or seventeen men, and their value paid, in money, by the paymaster to the caterer every quarter (or every three months).

Where does a ship's company take its meals?

In double-decked ships, on the gun deck; in single-decked ships, usually, on the berth deck.

Where does a ship's company repair for "GENERAL MUSTER?"

The petty officers in the starboard gangway; the remainder of the ship's company on the quarter-deck.

CHAPTER II.

RIGS OF VESSELS—MEN-OF-WAR, HOW CLASSED—NAMES OF
MASTS, YARDS AND SAILS, ETC., ETC.

Name the different rigs of sea-going vessels?

Ships, barques, barquentines, brigs, brigantines, herma-
phrodite brigs, two, three and four masted schooners,
and sloops.

How are vessels of the navy classed?

They are classed as 1st, 2d, 3d, and 4th rates, according
to their tonnage.

Which is the spar deck of a man-of-war?

The upper deck.

Which is the gun deck?

The one below the spar deck.

Which is the berth deck?

The one below the gun deck.* Below the berth deck
come the holds.

How is a ship divided lengthways?

Into fore, midship and after parts.

Which is the bow?

The front or foremost end of the ship.

Which is the stern?

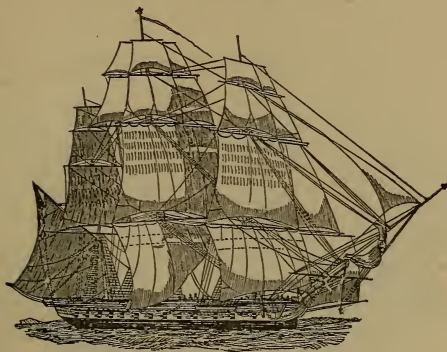
The aftermost end of the ship. The midship part is be-
tween the bow and stern, or the middle part.

Which is the starboard? Port side?

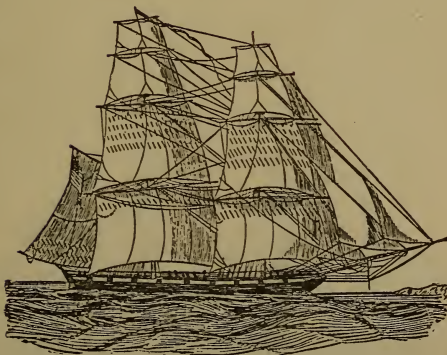
The starboard side is the right hand side looking towards
the bow. The port side is the left hand side looking
towards the bow.

* In single decked ships, the berth deck is the one immediately below
the spar deck. In double decked ships, when there is an orlop deck it
is the one below the berth deck.

RIGS OF SEA-GOING VESSELS.

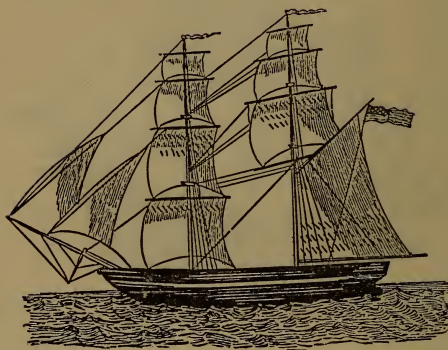


Ship under full sail.

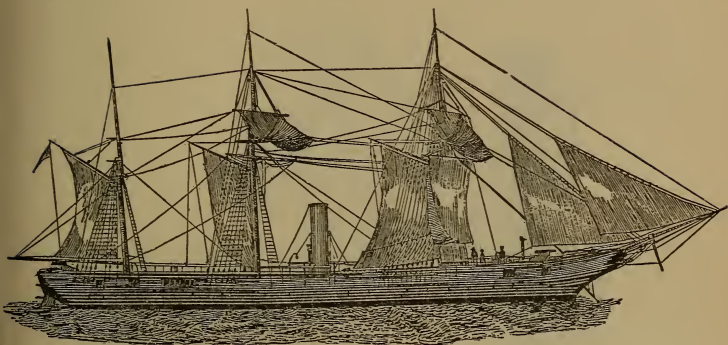


Brig.

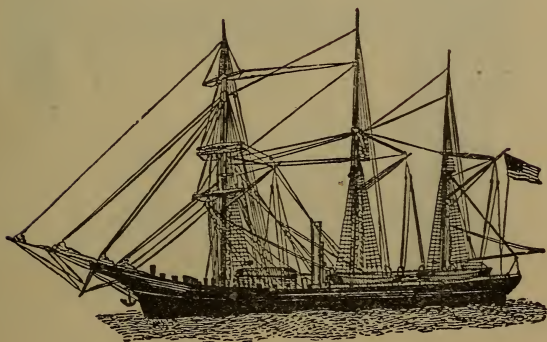
RIGS OF SEA-GOING VESSELS.

*Brigantine.**Hermaphrodite Brig (Iron Clad.)*

RIGS OF SEA-GOING VESSELS.

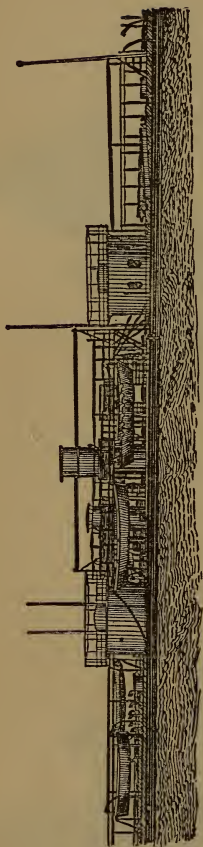
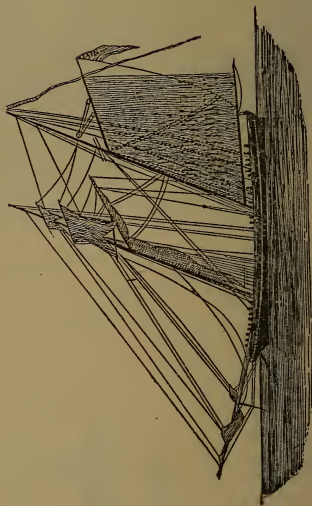


Barque sails loosed "to a bowline."

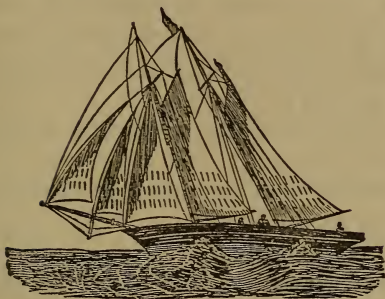


Barquentine with double topsail yards.

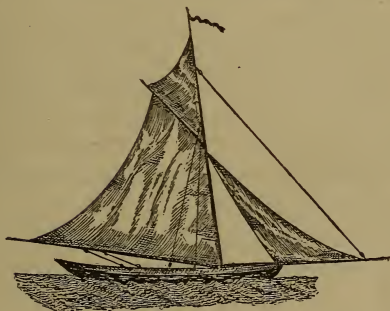
RIGS OF SEA-GOING VESSELS.

*Double-turreted monitor.**Topsail schooner.*

RIGS OF SEA-GOING VESSELS.



Fore-and-aft schooner.



Sloop.



Four-masted Ocean Steamer.

What is the keel ?

The first piece of metal or timber laid on the blocks when building the ship, it is the foundation from which all the other parts rise to form the ends and sides of the ship.

What is the stem ?

It rises from the fore part of the keel to form the bow.

What is the stern-post ?

It rises from the after part of the keel to form the stern.

What is the forefoot ?

The forward end of the keel.

What are the ribs ?

An expression for the framework, which, resting on the keel, form the sides of the ship.

What is a keelson ?

An internal keel, lying fore and aft above the main keel and lower pieces of the ribs, confining the floors in their places.

What are floor-timbers ?

Timbers of the frame which lie directly over the keel.

What are the knight-heads ?

Two strong uprights, one on each side of the upper part of the stem and apron, to strengthen the bow and support the bowsprit.

What is the apron ?

A timber next to and abaft the stem.

What is a false keel ?

An additional keel below the main keel. By offering greater resistance, it prevents the ship from being driven too much sideways through the water, away from the wind. It also protects the main keel should the vessel go ashore.

What is the bilge ?

That flat part of the ship's body on each side of the keel

at the floors, or the part in contact with the ground surface when the ship is ashore.

What are bilge keels ?

Large pieces of wood or iron, bolted to the outside of a ship's bottom, in a position to offer resistance to the water as the vessel rolls, thereby lessening the motion.

What are garboard strakes ?

The lowest planking outside, nearest to the keel, running fore and aft.

What are the bends ?

The thickest outside planking extending from a little below the water-line to the lower deck ports.

What is the counter ?

That portion of the stern from the water-line to the overhang.

What is the overhang ?

The part that projects over the main body of the vessel.

What is the water-line ?

There are two, the light water-line and the load water-line. The light water-line is the line of immersion of the ship when light or unladen; the load water-line is the line described around the ship's body when the stores are all on board and the ship is ready for sea.

What are the topsides ?

The upper part of a ship above the water-line.

What is the quarter ?

The upper part of the topsides at the after end of the ship.

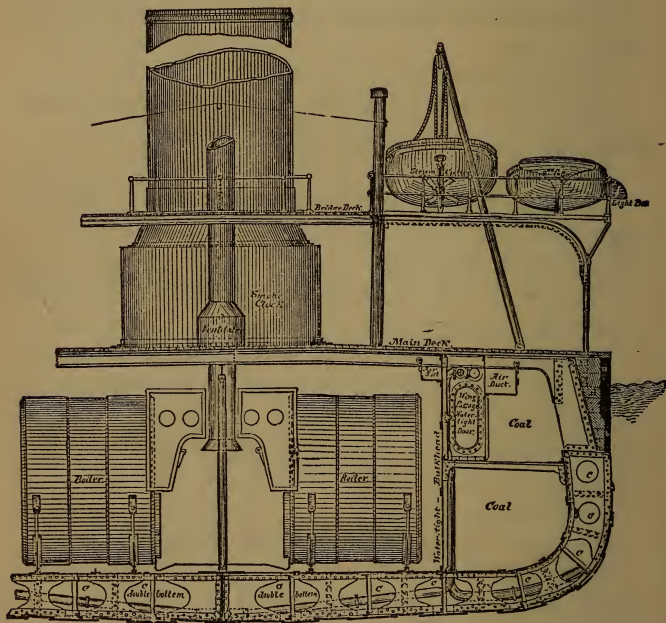
What are the quarter-galleries ?

Projections from the quarters of a vessel.

What is the run ?

The narrowing of the after part of the body of a ship from keel to counter.

CROSS SECTION—U. S. MONITOR "PURITAN."



a. armor · b. wood backing.

What is the cutwater ?

That part of the vessel forward of the stem; it divides the column of water through which the vessel passes.

What are limbers ?

Gutters formed on each side of the keelson, to allow the water to pass to the pump wells.

What are limber boards ?

A covering over the limbers.

What are limber chains ?

Small chains leading through the limbers, having a rope spliced to each end, used to clear the limbers by being worked backwards and forwards.

What is a double bottom ?

In most iron ships the frames, etc., are covered in with iron plates, forming an inner ship, the space between the inner and outer ship being termed a "double bottom." It gives strength and safety in case of damage to the outside skin.

What is kentledge ?

Pigs or bars of iron used for ballast.

What are water-tight bulkheads ?

The name applied to the sides of the compartments into which iron ships are divided athwart and fore-and-aft of the ship.

What are the wings of a ship ?

That part of the hold nearest the side of the ship.

What are chain-lockers ?

Spaces partitioned off in the hold under the chain-pipes, for stowing chain-cables.

What is a pump-well ?

An enclosure around the pumps to protect them from injury; it extends from the hold to the lower deck.

What are beams ?

Horizontal timbers lying across the ship, to support the decks and connect the sides.

What are clamps ?

Strakes of plank that extend all around the inside of the ship, for the beams to rest on.

What is spirketing ?

The inside planking just above the water-ways below the port.

What are water-ways.

Thick planking extending all around the inside of the ship, immediately above the beams.

What are scuppers ?

Holes lined with lead, cut through the water-ways and ship's side, to convey water overboard. Scupper plugs fit in, and close them when not in use.

What are partners ?

Frames of timber fitted into the decks, to strengthen them immediately around the masts, etc., etc.

What are ports ?

The openings in the ship's side through which the guns are pointed and fired.*

What are port-sills ?

The pieces of timber forming the upper and lower parts of the ports.

What are carlings ?

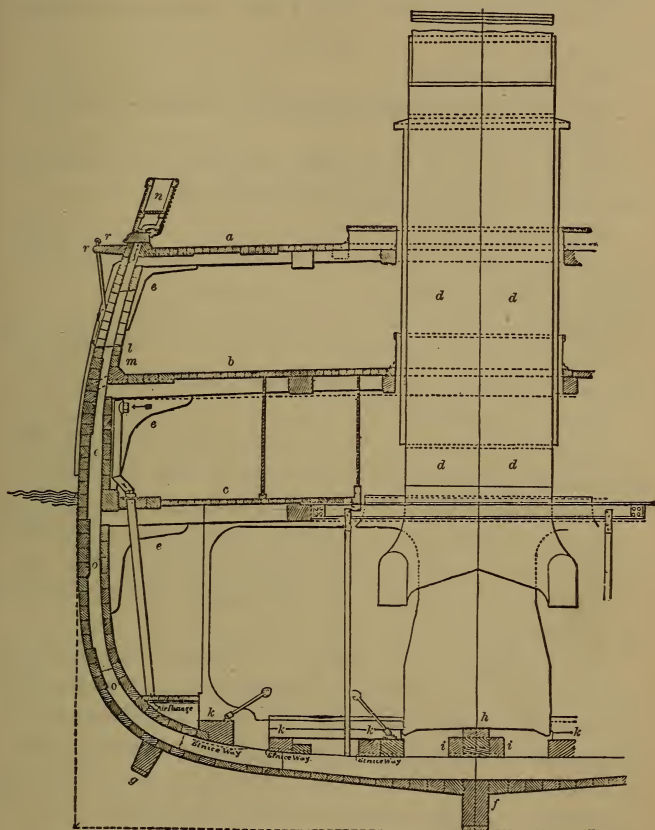
The short pieces of timber running fore and aft, connecting one beam to another, to distribute the strain of masts, capstan, and bitts among the several beams so connected.

What are ledges ?

Pieces of timber lying between the beams and jogged into the carlines and knees.

* On board merchant vessels, the ports are openings in the ship's side for receiving and discharging cargo, etc., etc.

CROSS SECTION—U. S. S. "LANCASTER."



a. spar deck; *b.* gun deck; *c.* berth deck; *d. d.* smoke stack; *e. e. e.* knees; *f.* main keel; *g.* bilge keel; *h.* main keelson; *i. i.* sister keelsons; *k. k. k.* boiler keelsons; *l.* spirketting; *m.* waterways; *n.* hammock nettings; *o. o. o.* ship's frame; *r.* channels.

What are knees ?

Pieces of wood or iron uniting the beams to the clamps and the ship's side.

What are stanchions ?

Pillars of metal or wood supporting a beam amidships.

What are treenails ?

Wooden bolts used in fastening the planks to the timbers and beams. They are rarely used in the navy.

What is caulking ?

Driving oakum between the planks; it is then payed (filled in) with pitch.

What is the rudder ?

A contrivance or apparatus used to steer the vessel; it hangs to the stern post by pintles and gudgeons.

What is the tiller ?

A piece of timber or metal fitted fore and aft into the head of the rudder, by which to turn it when steering.

What is the wheel ?

A framework shaped as a wheel; used to move the tiller and rudder, to which it is connected by wheel ropes.

What is the forecastle, the gangway (or waist) and the quarter deck ?

The forecastle is that portion of the spar deck from the after fore shroud forward. The gangway, or waist, that portion of the spar deck from the after fore shroud to the mainmast (also applied to the passage-way over the side). The quarter deck is that part of the spar deck abaft the mainmast, except in vessels having poop decks, when it only extends from the mainmast to the mizzen mast.

What is a topgallant-forecastle ?

A small deck in the bow of a vessel above the spar deck.

What is a poop deck ?

A small deck above the spar deck, extending from the mizzen mast aft.

What is the break of the poop?

The forward end of it.

What is the break of the topgallant-forecastle?

The after end of it.

What is a hatchway?

An opening in the deck forming a passage way from one deck to another, and into the holds.

What is a coaming?

The raised boundary of the hatchways, to keep water from going below. The pieces at the ends are called head-
ledges.

What are gratings?

Coverings of lattice work for the hatchways.

What are air ports?

Holes cut in the ship's side for light and ventilation, and closed with dead-lights.

What are scuttles?

Round holes cut in the decks.

What are bulwarks?

The planking around the vessel above the spar deck.

What is the taffrail?

The rail around the vessel's stern.

What is a bumpkin?

A short beam or metal bar projecting from each bow and from each quarter of a ship.

What are hawse-holes?

Holes in the bow of a ship for cables to pass through.

What are hawse-pipes?

Iron pipes fitted in the hawse-holes to take the chafe of the cable.

What are hawse-plugs ?

Plugs made to fit the hawse-holes to prevent any water coming on board. When made of canvass, stuffed or filled with oakum, they are called jackasses.

What are bucklers ?

Shutters fitted to confine the hawse plugs in the hawse holes and keep them from washing inboard.

What is the manger ?

Part of the deck partitioned off forward, to prevent any water that may enter through the hawse holes from running aft over the deck.

Where is the bridle port ?

The opening in the extreme bows of the ship, on each side.

What are chain-pipes ?

The holes for leading the cable through, as it passes from one deck to another from the chain lockers.

What are chain-bitts ?

The timber or iron heads fixed amidships in the fore part of the deck, to which, with the assistance of deck stoppers and compressors, the cable is secured.

What is a compressor ?

The large, movable, iron lever fixed at the bottom of each chain-pipe ; with the help of a tackle the cable is controlled as it runs out, by being nipped between the compressor and the lower part of the chain-pipe.

What is a capstan ?

A barrel of wood or iron turning around horizontally on a centre spindle ; it is used with the assistance of capstan bars, or by connection with a steam engine, for weighing anchors, lifting heavy weights, etc., etc.

What are the topsail sheet bitts ?

Vertical timbers projecting above the deck near to, and forward of, the masts.

What is a fife-rail?

The rail around the mast with pins in for belaying ropes.

What is a pin-rail?

A timber bolted to the inside of the bulwarks, a convenient distance from the deck, with pins in for belaying ropes.

What is a belaying-pin?

A wooden or metal pin for belaying ropes.

What is an eye-bolt?

A bolt with an opening in the head to which a tackle may be hooked. An eye-bolt with a ring welded into the eye, is a ring bolt.

What is a cat-head?

A piece of timber, or an iron davit projecting from each bow of the ship, to support an anchor.

What is a fish-boom or davit?

A movable spar or an iron projection, for raising the fluke of an anchor and placing it on the bill-board.

What is the bill-board?

A ledge on the ship's side to support the fluke of an anchor.

What are the channels?

Platforms projecting out from the ship's side to give greater spread to the lower rigging.

What is a bridge?

A platform extending, above the rail, across the ship, for the convenience of the officer in charge of the deck.

What is a horse-block?

A grating platform for the convenience of the officer-of-the-deck.

What are chain plates?

Iron plates for securing the lower dead eyes to the ship's side.

What are side or sea steps?

Pieces of oak, fastened on the ship's side at the gangway, for the convenience of ascending and descending, when the accommodation ladder is unshipped.

What are accommodation ladders?

Convenient ladders shipped at the gangway. When shipped on both sides, the starboard ladder is reserved for commissioned officers and their visitors.

What is a goose-neck?

A sort of iron hook fitted into the end of a boom; it is intended to be hooked into a clamp or eye bolt, and can be unhooked at pleasure.

What are davits?

Outriggers projecting from the ship's side, to which the boats are hoisted.

What are hammock-cloths?

Pieces of canvas made to fit the nettings, painted black, used to cover the hammocks.

What are hammock-nettings?

Spaces on the rail for hammocks, to stow, when not in use.

What are head-boards?

Boards placed at the forward and after ends of hammock nettings.

What is a boom-cover?

A large painted canvas cover extending over the booms and boom-boats.

What is a galley?

The cooking apparatus on board ship.

What is the magazine?

The place where all powder is stowed.

What is the shell-room?

The place for stowing the shell.

How is the position of the water line pointed out on the inside of a vessel?

A black line, about two inches wide, is painted all around the inside of a ship, *directly opposite* the water line. The position and number of each port is plainly marked on this line.

What is the object of the composition figures on the stern and stern post of a vessel?

To determine the draught of water.

What is the draught of water?

The distance (or depth) of the bottom of the keel of a vessel, below the surface of the water.

How do you determine the draught?

The bottom of the figures, on the stem or stern, mark the even feet, for example the bottom of 9 is an even nine feet draught of water. The figures are six inches long, therefore the top of the figure 9 will be nine feet six inches draught. The inches in the space between the top and bottom of the figures, and in the spaces between the figures themselves, must be calculated by the eye.

Point out all the foregoing parts of the ship and fittings. In addition point out the cabin, ward room, steerage, holds and sick-bay, and explain their uses.

MASTS—SPARS AND SAILS.

What are masts?

Upright spars which are placed in a vessel to support the yards, gaffs, and booms.

How are masts named?

From the position in which they are placed in a vessel, named foremast, mainmast and mizzen mast.

What is the foremast?

The most forward one.

What is the mainmast?

The middle one.

What is the mizzenmast?

The one farthest aft.

The mainmast is the largest, the foremast is next in size, and the mizzenmast is the smallest of the three.

Into how many parts are each mast divided?

Into four parts or sections, lower mast, topmast, top gallant-mast, and royal mast.

Why are these divisions made?

Even if a spar of sufficient length could be obtained for the entire mast, it would be almost impossible to give a single spar the proper support. And, it is necessary to be able to send down the upper parts of the mast and leave the lower ones in position.

What are lower masts?

The lower part or section of each mast. They rest or step, on the keelson, except the mizzenmast, which, in smaller vessels, steps in the ward room.

What are topmasts?

The next pieces above the lower masts.

What are topgallant-masts?

The next pieces above topmasts.

What are royal-masts?

The upper pieces, and are a continuation upwards of the topgallant-masts.

So we have here three principal masts, each of which is composed of four masts.

What are trysail masts?

Small masts immediately abaft the fore and main masts, to which they are connected.*

What is the spanker mast?

A small mast immediately abaft the mizzenmast, and connected with it.*

What is a jury-mast?

A temporary mast rigged in a ship, to replace one that has been carried away.

YARDS AND SAILS.

What are sails spread upon?

Upon yards crossed upon each mast, upon gaffs, and upon stays and booms.

What are yards?

Spars, suspended from a mast, to which the head of a sail is attached.

How are they named?

From the mast to which they are attached, and the sails they spread, viz.; maintopsail yard, fore-topgallant yard, and mizzen-royal yard.

What are gaffs?

Small spars projecting abaft the masts.

What is a boom?

A long spar used to extend or boom out the foot of a particular sail. It takes its name from the sail it extends.

Where is the cross jack yard?

The lower yard on the mizzen mast; there is no sail spread on it.†

Point out the main yard. What sail does it spread?

The mainsail.

Point out the fore yard. What sail does it spread?

The foresail.

* Trysail and spanker masts are seldom used now.

† Merchantmen sometimes set a sail on the cross jack yard.

Point out the foretopsail, maintopsail, and mizzen-topsail yards. What sails do they spread?

Foretopsail, maintopsail, and mizzen-topsail.

Point out the fore-topgallant, main-topgallant, and mizzen-topgallant yards. What sails do they spread?

Fore-topgallant sail, main-topgallant sail, and mizzen-topgallant sail.

Point out the fore royal, main royal, and mizzen royal yards. What sails do they spread?

Fore royal, main royal, and mizzen royal sail.

Point out the fore and main trysail, and spanker gaff. What sails do they spread?

Fore trysail, main trysail, and spanker.

What are the "head yards?"

The yards crossed on the foremast.

What is the bowsprit?

The large spar that projects out from the bows of a vessel.

What is the jib-boom?

It projects outside of, and is supported by the bowsprit.

What is the flying jib-boom?

It projects outside of, and is secured to the jib-boom.

What is the dolphin striker or martingale boom?

The spar that projects down from the bowsprit.

What are the whisker booms?

The spars that project from each side of the bowsprit.

What are the "head booms?"

The bowsprit, and booms connected with it.

Where is the jib?

It is set, or spread upon the stay called the jib-stay, which leads from the foretopmasthead to jib-boom end.

Where is the flying-jib?

It is set, or spread upon the stay called the flying-jib stay, which leads from the foretopgallant-masthead to the flying jib-boom end.

What are staysails ?

Three-cornered sails set upon stays, other than the jib and flying-jib stay.

What are square sails ?

Sails that are spread by yards.

What are fore-and-aft sails ?

Sails that are not spread by yards, but spread by stays or gaffs, such as the jib, staysails, trysails and spanker.

What are the "head sails ?"

The sails spread on the foremast and forward of the foremast.

What are the "after sails ?"

Those sails spread on the mainmast and abaft the mainmast.

What are the "light sails ?"

The topgallant sails, royals, flying jib and topgallant staysail.

What are boat sails ?

Those sails fitted for, and used in the boats.

What are awning stanchions ?

Wooden sometimes, but usually iron stanchions secured outside the ship, to assist in supporting the rope that the awning hauls out to.

What are awnings ?

Canvas coverings, spread over the deck of a vessel to protect the crew from the sun and weather. The forecastle awning, is from the foremast forward, maindeck awning, from the foremast to the mainmast, the quarter-deck awning, from the main to the mizzen mast, the poop awning from the mizzen mast aft.

What are awning, or side-curtains?

Strips of canvass, set between the ridge rope and the rail.

What is a smoke sail?

A piece of canvas fastened on two small yards, hoisted on the foremast, to prevent the smoke of the galley from soiling the mast.

What are weather-cloths?

Tarpaulins placed in the weather rigging, to shield the men and officers on watch.

What are the lower booms?

The booms rigged outside the ship on each side of, and abreast the foremast, to spread the lower studding-sails.

What are studding sails? (Pronounced stun'sails.)

Sails set outside the square sails on each side of the ship; they are spread at the top upon yards, and at the bottom by booms. They are only set upon each side of the foresail, foretopsail, foretopgallant sail, maintopgallant sail, and sometimes, but rarely, on each side of the maintopsail.

In addition to the sails in general use on sea-going vessels, in the merchant service, they use skysails, small sails set above the royals; sky-scrapers, sometimes called star-gazers, a triangular sail set above the skysails. Inner-jib, a sail set just inside the jib; jib-o-jib, a sail set outside of the flying jib; and jib-topsail, a small light sail set on the topmast stay of sloops and schooners.

Almost invariably in the merchant service, they use "double-topsail yards," or one topsail yard immediately above the other, called the upper and lower topsail yards; each yard spreads a separate sail, called upper and lower topsails. This rig is for convenience in reefing, and reducing sail.

What are "mooring shackles?"

Heavy "D" shaped pieces of iron under the fore, main and mizzen chains on each side; for mooring chains to shackle to, when a ship is moored to a wharf or dock. They are bolted through the timbers of the ship, and secured inside with heavy iron plates.

What are torpedo booms?

Spars attached, outside, to a vessel's bow and sides, to use in exploding torpedoes.

CHAPTER III.

PARTS OF A MAST, BOWSPRIT, YARDS, AND SAILS.

What are masts and bowsprits made of?

Wood, iron and steel. The wood used is pine, spruce, fir, etc., etc. Iron and steel masts and bowsprits are used principally in vessels made of that material; being hollow they act as ventilators. Wooden lower masts in the navy



SECTION OF
A LOWER MAST.

are made of four principal pieces united by dowels and hoops—the inner corner of each piece is cut off so as to leave a square hole extending the whole length of the mast; this permits a closer contact of the parts: top-masts are of one piece: top-gallant and royal masts are in one.

What is the step?

The timber on which the heel or bottom of a mast, or bowsprit rests.

What is the hounding?

The length of the mast, from the heel to the lower part of the head.

What is the mast head?

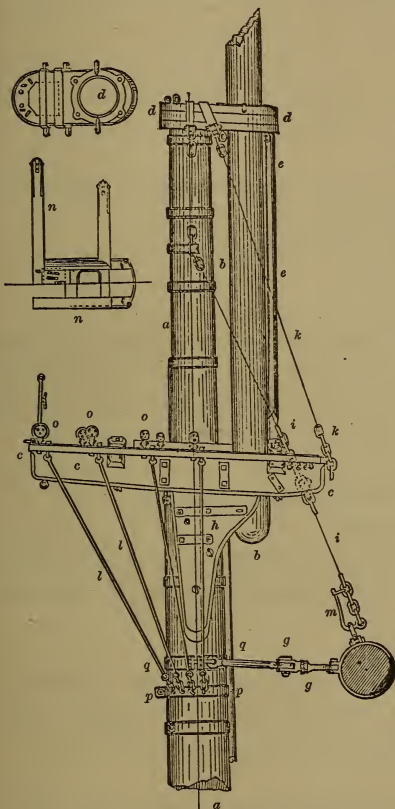
From where the rigging is placed to the top of the mast.

What are the bibbs?

Side pieces bolted to the hounds to support the trestle-trees.

What are the hounds?

SECTION OF A LOWER MAST AND TOPMAST, SHOWING THE DOUBLINGS OF THE MASTS, TOP, ETC., ETC.



n. n. section of topmast cross-trees and trestle-trees.

o. o. o. lower dead eyes of topmast rigging.

p. p. futtock band.

q. q. truss band.

a. a. lower mast; *b. b.* topmast; *c. c. c.* top; *d. d. d.* cap; *e. e.* capshore; *f.* lower yard; *g. g.* truss; *h.* bibbs; *i. i.* slings; *k. k.* preventer slings; *l. l.* futtock shrouds; *m.* slip or pelican hook.

The projections at the mast-head which support the trestle-trees of the lower and topmasts, and the rigging of the upper or smaller masts.

What are the trestle-trees ?

Fore-and-aft pieces, one on each side of the mast, upon which are placed the cross-trees. There are lower and topmast trestle-trees.

What are cross-trees ?

Two cross pieces on top of the trestle-trees. There are lower and topmast cross-trees.

What are the "horns of the cross-tree ?"

The outer ends or arms.

What are tops ?

Platforms of oak of two thicknesses, resting upon the lower mast cross-trees and trestle-trees, used to spread the topmast rigging, and for the convenience of men working aloft.

What is the top rim ?

The sweep which forms the edge of the top.

What is the lubber's hole ?

The space between the top and mast-head which affords a passage into the top, and allows space for the lower rigging.

What are the doublings ?

That portion of the two masts between the trestle-trees and the cap. That is, where the head of one mast doubles with the heel of another.

What is a gin bar ?

A short stout bar of iron placed across the topmast trestle-trees, between the doublings of the mast, with links or shackle eyes for the gin-blocks of topsail tyes.

What is a cap ?



CAP.

Thick block of wood, iron bound, fixed upon the heads of the lower and topmasts, and bowsprit, for the topmasts, topgallant-masts, and jib boom to pass through. It supports them in position.

What is a capshore?

A support under the fore part of a lower cap to prevent it drooping.

What are mast wedges?

Pieces of wood, placed between the mast and the partners of a deck, to keep it upright in its place.

What are mast coats?

Pieces of prepared canvas fitted around the partners of a mast, to prevent water from getting in and rotting the wood.

What are bolsters?

Pieces of oak placed on the trestle-trees, for the eyes of the rigging to rest on, and prevent a sharp nip; sometimes the lower trestle-trees are rounded off and covered with composition, as a substitute for bolsters. The oak bolsters on the *topmast trestle-trees*, are covered by the rounded shoulder which projects from, and is a part of, the topmast funnel. With hemp rigging, bolsters were of soft wood covered with canvas.

How are lower mast heads protected from the chafe of the lower rigging?

Composition plates are fitted on each corner of the mast head.

What are the jack cross-trees or jack?

An athwartship iron bar at the top gallant mast head, for spreading the royal rigging which reeves through eyes in the end. The top-gallant funnel and jack are in one.



JACK AND FUNNEL.

What is the bed of a bowsprit?

That part of the stem and apron upon which the bowsprit rests. In wooden ships it is lined with lead to prevent water from getting in.

What are the shoulders of the jib and flying jib-boom?

The part that the band for the rigging fits over.

What are the bees?

Chocks of wood on each side of the bowsprit, between the rigging and the cap, for the fore-topmast stays to reeve through.

What is the saddle of jib-boom?

A chock of wood on top of the bowsprit to fix the heel of the jib-boom in, and keep it in place.

What are jaws?

Two cleats on the inner end of a gaff or boom, forming a semicircle, to keep it in its place against the mast, also on the slings of topsail, top-gallant, and royal yards.

What is the heel of a spar?

The lower end.

What is the head?

The upper end.

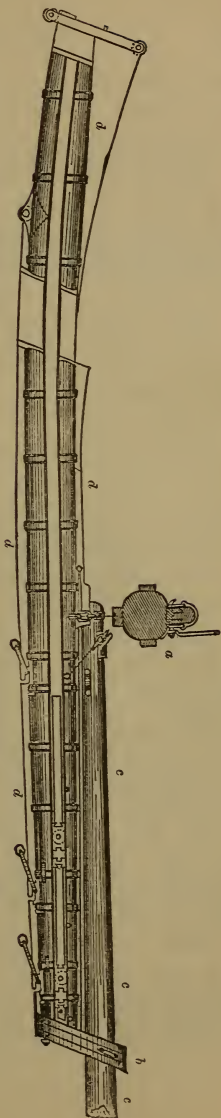
What is a fid hole?

A hole in the heel of a topmast or topgallant-mast, for the fid.

What is a fid?

A bar of iron or wood put through the fid hole of a mast,

BOWSPRIT AND JIB-BOOM.



Side view, Bowsprit and Jib-boom, fitted to rig in quickly for ramming.



Top view of Bowsprit.

a. Trigger to throw jib-boom out of the saddle when rigging in ; *b.* bowsprit cap ; *c. c. c.* jib-boom ; *d. d. d.* bowsprit.

and across the trestle-trees, to support a topmast or topgallant-mast. Fids should have laniards attached, to prevent their falling from aloft.

What is a preventer fid?

A short fid passed through a hole in the mast about two feet above the fid hole. It is put in as soon as the preventer fid hole gets above the trestle-trees when sending up topmasts.

What is the sheave hole?

An opening cut in the topmast, topgallant-mast, and other spars in which a sheave is fitted, to reeve the yard and other ropes.

What is a dumb sheave?

It is simply a groove in the heel of a topmast, for a hawser or pendant to lie in.

What is the royal pole?

That part of a royal mast above the royal rigging, between it and the truck.

What is the truck?

A circular piece of wood on the head of the royal mast, in which is the sheave for the signal halliards.

What is the lightning conductor?

A small copper rope or wire, which extends from the top of each royal mast, (running down the royal backstay) to the copper sheathing on the vessel's bottom.

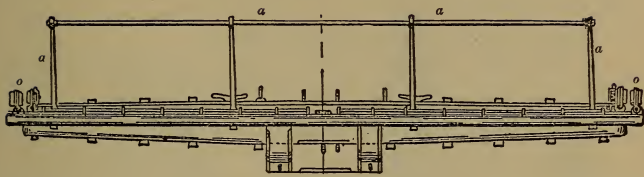
What is a jack-staff?

A short staff raised at the bowsprit cap, upon which the jack is hoisted.

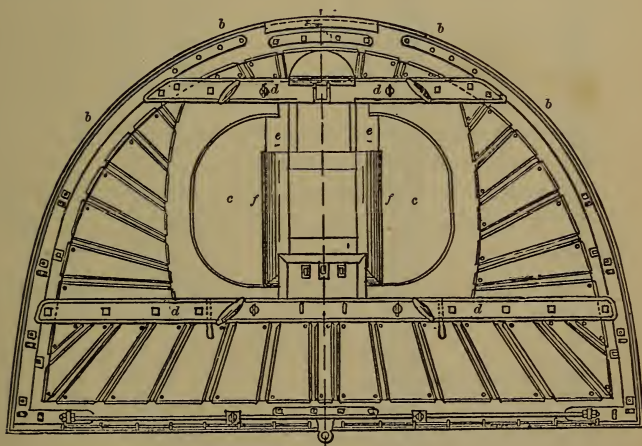
What is an ensign staff?

A staff rigged over the stern upon which the ensign is hoisted, when not hoisted at the peak.

What is understood by a spar "buckling?"



VIEW OF A TOP FROM AFT.



TOP VIEW OF A TOP.

a. a. a. top rail; *b. b. b.* top rim; *c. c. c.* lubber's hole; *o. o.* dead eyes for topmast rigging; *d. d.* cross-trees; *e. e.* trestle-trees; *f. f.* bolsters.

The bending or bowing of a spar when not properly supported, or when too great a strain is put on it. It is a sign of weakness.

Where are spars most likely to decay?

At the heel, partners and cap, or any part where the water can get in and air cannot freely circulate.

Yards.

What are the slings of a yard?

The centre or middle of the yard. The name is also applied to the chain that goes around the lower mast-head, and secures to the yard by a slip bolt.

What are the jaws?

The projections at the slings embracing each side of the mast.

What are the yard-arms?

The extremities or ends.

What are the quarters?

That part between the slings and the yard arms.

What are the shoulders or hounds?

That part of the yard between the outer quarter and the yard arm, over which is placed the rigging or iron band for blocks.

Point out all the foregoing parts of the masts, yards and booms.

Parts of Sails.

What are sails made of?

Flax canvas.*

How is it graduated as regards strength?

No. 1 to No. 10. No. 1 is the strongest, and it gradually decreases in strength to No. 10, which is the finest. Ravens duck is used, and is even finer.

* This is the regulation for the navy. In the merchant service, sails are frequently made of cotton canvas.

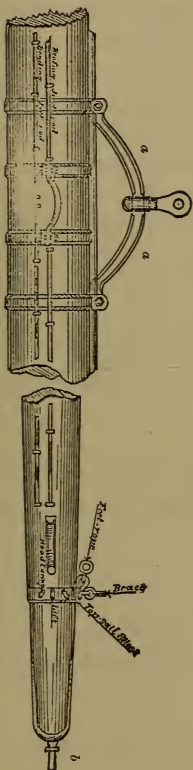
LOWER AND TOPSAIL YARDS.



Main topsail yard, from slings to pacific iron.



Main yard, from slings to pacific iron.



Slings or centre of yard—Yard arm showing iron band for rigging.

a. a. Truss ; b. pacific iron.

What sails are made of No. 1 canvas?

All fore-and-aft storm sails and usually one foresail and one fore and main-topsail, to be used as storm sails.

Name the fore-and-aft storm sails.

The fore, main and mizzen storm staysails, fore and main trysails, and storm mizzen, the last being set on the spanker mast, or abaft the mizzen mast.

What is the strength of canvas for other sails?

Graduated according to the class of vessels for which they are made, the coarsest and strongest for the larger vessels, as follows: courses made of No. 2. Fore and main-topsails of No. 2, mizzen topsails of No. 3 to No. 4, fore and main-top-gallant sails of No. 4 to No. 7, mizzen top-gallant-sails of No. 6 to No. 7, royals of No. 8 to No. 9, jibs of No. 2 to No. 4, flying jibs of No. 5 to No. 7, spankers of No. 2 to No. 3, and studding sails of No. 5 to No. 9. Boat sails are made of heavy and light cotton raven duck.

What are the cloths of a sail?

The strips of canvas forming the sail. In the sail-loft the name applies to a strip of canvas about 39 yards long and 24 inches wide.

What is a bolt of canvas?

Cloths rolled up; a bolt usually contains about 80 yards.

Name the principal parts of a square sail.

The head, foot, leeches, clews, head-earing-cringles and bunt.

What is the head?

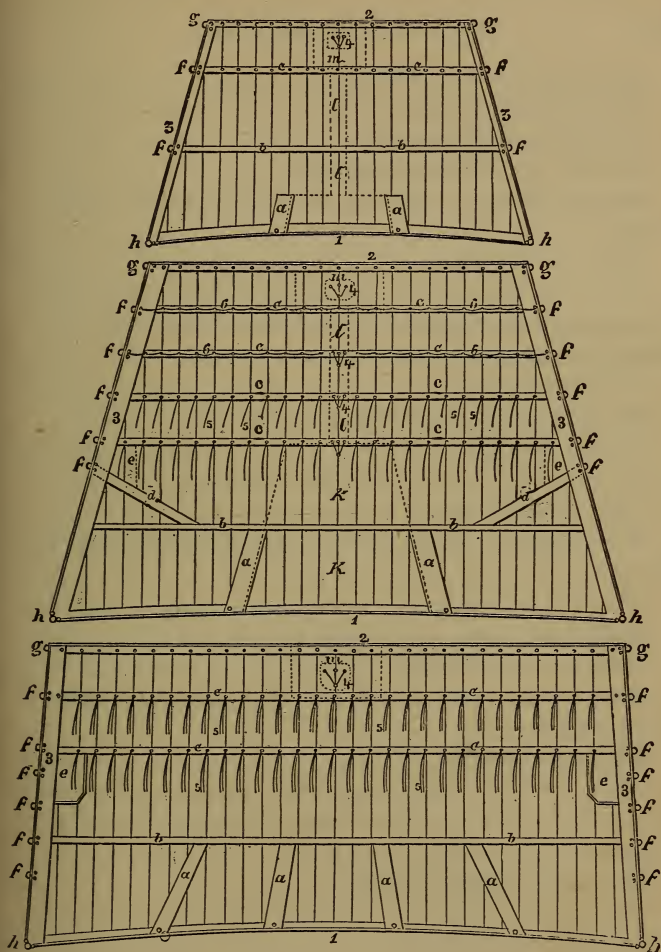
The upper edge that is made fast to the yard.

What are the leeches?

The two sides.

What is the foot?

TOPGALLANT SAIL, TOPSAIL AND COURSE.



Dotted lines indicate the after side of the sail.

1. 1. 1. foot; 2. 2. 2. head; 3. 3. 3. leeches; 4. 4. 4. gluts; 5. 5. 5. reef points; 6. 6. 6. grab-lines for becketts and toggles.

a. a. a. buntline cloths; b. b. b. belly bands; c. c. c. reef bands; d. d. spur pieces; e. e. reef tackle patches; f. f. f. leech cringles; g. g. g. head earing cringles; h. h. h. spectacles. k. k. top lining (on after side); m. m. m. bunt lining (on after side). l. l. mast lining (on after side).

The bottom or lower edge.

What are the clews?

The two lower corners.

What are the head-earing-cringles?

The cringles spliced into the two upper corners for head-earing.

What are cringles?

Strands of rope worked around and into the roping, for head-earings reef-earings, bowline-bridles, etc.; they have thimbles in them to prevent chafe.

What is the bunt?

The middle part of the sail.

What is the bolt rope?

The rope sewed around the sides of the sail.

What is the tabling?

The double part of the canvas to which the bolt rope is secured.

What are head-holes?

Eyelet holes in the head of sails, for the robands.

What are eyelet holes?

Holes formed in the tabling and reef bands, for cringles, reef points etc., etc.

What are robands?

Pieces of spun yarn, rope yarn etc., etc., hitched through the eyelets or head holes, for securing the sail to the yard.

What is the midship roband?

The middle roband; it is of larger stuff and is the first one made fast to the yard.

What are reef bands?

Double pieces of canvass sewed across the sail for working the eyelet holes for reef points, and to take the strain

when the sail is reefed. The first and second reef bands are usually fitted as french reefs, with grab lines for beckets and toggles, and the third and fourth reef band with points.

How many reef bands have square sails?

Courses have two, topsails have three and four, except the mizzen topsail which rarely has more than two; the last reef is called the close reef.

What is the belly-band?

An extra piece of canvas sewed across the topsail or course, below the lower reef band, for additional strength.

What is a foot-band?

An extra piece of canvas sewed along the foot of a sail, on the after side.

What is a top-lining?

The extra piece of canvas sewed on the after part of a topsail from the belly-band to the foot (the width of the top) to protect the sail from the chafe of the top.

What is a mast-lining?

An extra piece of canvas sewed on the after side of a sail to protect it from the chafe of the mast.

What are buntline cloths?

Extra pieces of canvas on the forward part of the sail extending in an angular direction from the foot to the belly-band, to take the chafe of the buntlines.

What is a reef tackle patch?

The extra piece of canvas sewed on the forward part of the sail, at the reef tackle cringles, to take the strain of the reef tackles.

What are head-earings?

Pieces of rope spliced into the head-earing-crinkle, to haul the head of the sail taut along the yard.

What are reef earings?

Pieces of rope spliced to the eyelet holes below each reef earing-crinkle, and seized to the cringle. Each earing is made fast to the cringle next above its own, the first reef earing being made fast to the yard. This is done so that the earings will be in reach of the men on the yards when reefing. Reef earings are used to haul up, and make fast, the reef cringles to the yard, when reefing.

What are bowline-bridles?

Pieces of rope spliced into the bowline cringles, having a toggle to which the bowline is toggled.

What are spectacles?

Pieces of iron, with three or more eyes, spliced into each clew of topsail, course, and topgallant-sail.

What are gluts?

Strands of rope spliced into the middle cloth of a sail, with a thimble turned in to prevent chafe. Courses have one on the after side of the sail, topsails have one on the after side and two or three on the forward side of the sail. The gluts on the after sides are used for hooking the bunt-whip to in furling. The gluts on the forward side are used to hook the bunt-whip to, when used as a midship bunt-line, and to hook the midship buntline to, in order to haul up the slack sail in close reefing.

Top-gallant sails of large ships sometimes have bowline bridles, but neither top-gallant sails nor royals are reefed, although top-gallant-sails sometimes have reef bands.

What are gaskets?

They are classed as harbor and sea gaskets. Harbor gaskets take their names from the position they occupy on

the yard, as bunt, quarter and yard arm gaskets; they are usually made of sword mat or *heavy canvas*. Those for the bunt consist of two single legs, one on each side of the slings, varying from two to three inches in width, and fitted with a thimble in one end by which it is secured to the bending jackstay, with a permanent seizing, the other extremity having a laniard, which is hitched to the opposite quarter of the yard on top; the gaskets crossing each other on the bunt when the sail is furled. The quarter and yard-arm gaskets are made in the same manner as the bunt gaskets, only shorter as they approach the yard-arms, and are secured at equal distances (generally about every third seam) along the yard *underneath* the jackstay, by a cross seizing. The gasket lies under the head of the sail. When furling it is taken up forward and over, and the end rove through a staple on the after part of the yard, the sail tossed well up, and the end of the gasket expended around its own part.

In making harbor gaskets, the broad part should be long enough to take the sail in when furled with two reefs; they should be carefully blacked, and to avoid staining the sail, should be lined with duck. Harbor gaskets are sometimes made fast to the head of the sails.

The sea gaskets or furling lines (of which there are three on each arm of the lower and topsail yards, and one on each arm of the light yards) may be either of sennit or small sized rope, and of sufficient length to take several turns around booms and all, when furling in heavy weather. These however are not permanently secured to the yard, but are usually put round it at the outer and inner quarters with a running eye, and the surplus end bighted up with frapping turns and thrown forward of the sail at sea.

What are back cloths?

Triangular pieces of canvas secured to each quarter of the topsail yards; they are for convenience in stowing the bunt of a topsail.

What is the "hoist" of a sail?

A term applied to sails whose yards travel up and down masts; it is the distance from the head to the foot, as, one topsail has more hoist than another.

What is the "drop" of a sail?

A term applied to courses, the distance from the head to the foot, as, one main-sail has more drop than another.

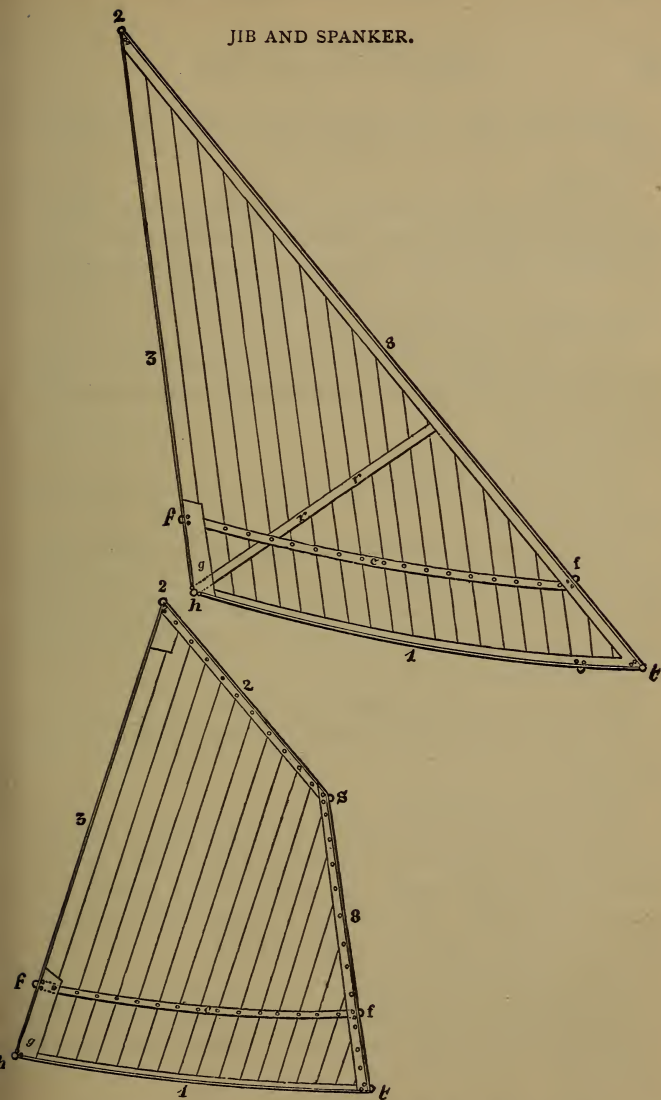
What are the principal parts of the fore-and-aft sails?

The forward corner of the foot or lower edge, is the "*tack*," the after corner of the foot is the "*clew*," the forward corner of the head or top is the "*throat or nock*," the after corner of the top is the "*peak or head*." The forward edge is the fore leech or luff, the after edge is the after leech.

How are fore-and-aft sails made fast to the spars and stays?

Trysails and spankers are made fast to the hoops (which travel on the masts and gaffs) by robands, rove through the eyelet holes, in the fore leech and head. The staysails and jibs travel by hanks, or lacings on the stays. Vessels are now being fitted for try sails and spanker as follows—a composition bar fitted with a slot down its centre is bolted to the after sides of the fore, main and mizzen masts, and the under sides of the gaffs—these slots have composition travelers working in them, which take the place of the hoops; to the eyes in the travelers the robands of the sails make fast; with this rig the try sail and spanker masts are done away with.

JIB AND SPANKER.



r. r. foot; *2. 2.* head; *3. 3.* after leech; *8. 8.* fore leech or luff; *f. f.* leech cringles; *h. h.* spectacles; *s. s.* throat or nock; *t. t.* tack; *g. g.* strengthening or clew patch.

What sails play the principal part in the handling of a ship?

Topsails.

The spanker sometimes has a reef band running diagonally, called a balance reef. The lower studding sail has a reef called a rolling reef. And the topmast studding sail has a reef so it can be set with reefed topsails.

What is the roach of a sail?

Where the foot is hollowed out to prevent chafe on the stays etc., etc. Sometimes the leeches are roached to get a taut reef band.

What is a goring cloth?

Any cloth cut obliquely, as those on the jib and in the sides of a topsail.

Roping is always sewed on the *after side* of square sails; from this you can always distinguish the after side from the forward side. On fore-and-aft sails, the roping is sewed on the port side. A sail is always bent with the roping between the sail and the yard.

What are the principal parts of an awning?

The back-bone, shark's-mouth, earings, stops, lacings, etc., etc.

What is the back-bone?

A rope stitched to the middle of the awning; it runs fore and-aft, has a thimble in both ends, to the forward end the fore-and-aft-tackle hooks, the after thimble secures to a hook on the mast. The awning is hauled out at the corners by earings, and at the sides by stops.

What is the shark's mouth?

An opening to accommodate the masts and stays. The "dog's ear" is one of the peculiar corners formed by this opening.

What is the lacing?

The line which draws together the ends of adjoining awnings.

What is the ridge-rope?

The rope running fore-and-aft, on each side of the ship, to which the awning is hauled out. This rope is supported by the stanchions and rigging.

In very warm climates, (East Indies etc., double awnings are used, one stretched above the other.

Point out all the foregoing parts and fittings of the sails and awnings.

CHAPTER IV.

STANDING RIGGING—NAMES OF, ETC., ETC.

To steady and secure the masts and booms of a vessel, it is necessary to have, at least, three separate supports. These supports are permanent or standing, and are called the “*standing rigging*.”

What are stays?

The ropes leading from the head of, and supporting a mast from forward.

What are shrouds?

The side supports leading from the head of the masts.

What are backstays?

The supports leading from the head of the upper masts, abaft, down to the ship's side.

Why has each mast more support sideways and aft, than it has forward?

Because the force of the wind on the sails blows the mast forward, and opposite to the point from which the wind blows.

What are guys?

The side supports of a boom.

What are bobstays?

The downward and principal supports of a bowsprit. Bobstays are the most important supports in a vessel; they support the bowsprit, which in turn supports the foremast, which in turn supports the mainmast, or a portion of it, and the main supports the mizzen or a portion of that mast. Should bobstays carry away, all masts are endangered.

What are bowsprit shrouds?

The side supports of a bowsprit.

What are back ropes?

Ropes shackled to the end of the dolphin striker, leading to, and setting up at the bows, well abaft the cutwater, to give a good spread; and are used to prevent the dolphin striker from canting forward.

What are the jumpers?

They lead from the ends of the whisker boom to the cutwater, to prevent the whiskers from canting upwards. In straight stemmed vessels (see "Trenton") they lead to the dolphin striker. The straight stem is too far aft to give a proper support to the whiskers.

What is a jib martingale?

The downward support of a jib-boom.

What are jib guys?

The side supports of a jib-boom.

What is a flying jib martingale?

The downward support of a flying jib-boom.

What are flying jib guys?

The side supports of a flying jib-boom.

What is a jib netting?

The net work under the jib-boom, which is seized to the whiskers and jib guys; frequently a flying jib netting is placed under the flying jib-boom. These nettings are to catch and hold the jibs when loosed and not hoisted, and they will prevent people falling overboard from the head booms.

What is a flying-jib wythe?

A species of iron cap or band on the end of the jib-boom, to support the flying jib-boom.

How is standing rigging named?

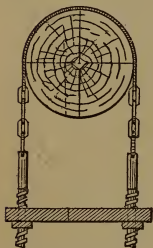
Each stay, shroud, backstay and guy, has the same name as the spar which it supports, for example; the supports of the main-topgallant-mast, are the main-topgallant shrouds, the main-topgallant stay and the main-topgallant backstays.

What are fore-and-aft stays ?

All stays that lead forward.

What is gammoning ?

A heavy iron band set up with a nut and screw, used to secure a bowsprit in its bed.



GAMMONING.

What are futtock shrouds ?

The iron rods leading from an iron band on the lower masts, called a futtock band, to an iron plate near the top rim called a futtock plate, these shrouds take the strain of the topmast, and keep the top from warping up. They frequently have ratlines on them for convenience in getting over

the top.

What is a futtock staff ?

A leather covered iron rod inside the lower and topmast rigging. In the former, the running rigging leads over it, in the latter the top-gallant shrouds lead over it.

What are laniards of rigging ?

Small hemp ropes which connect the upper and lower dead eyes, hearts, etc., etc.; used to set up and secure the end part of the rigging.

How do you determine the size of laniards ?

If the rigging is hemp, the laniard is $\frac{1}{2}$ the size of the rigging; if of iron wire, the laniard is the same size as the rigging.

What is a dead eye ?

The piece of *lignum vitæ* with three holes in it, through which is rove the laniard of the rigging.

What is a heart?

A peculiar sort of block having one large hole in the centre, in which are three or four scores, and a groove around the circumference; used generally for the laniards of heavy stays or bobstays.

What is a thimble?

An iron ring, the outer surface so shaped, that it may be held in position by a rope, when spliced around it.

What are mast head pendants?

Short pieces of rigging hanging from the lower mast heads, two on each side, with thimbles turned in the ends; both legs are the same length. They are used to get the mast in its proper position and for setting up the lower rigging, etc., etc.

What are burton pendants?

On small vessels they are four pieces of wire rope, of proper length, shackled, two on each side, under the topmast trestle-trees. Experience, however, has proved that this method of fitting burton pendants will greatly weaken, and bring too heavy a strain on the topmast trestle-trees, they are now being fitted to go over the mast head in the same manner as lower pendants, particularly in large vessels. They are used in setting up rigging, securing lower yards for heavy weights, etc., etc.

What is a sheer pole?

An iron rod seized to the shrouds, just above the dead eyes, and parallel to the water, used to steady the lower rigging, also to keep the dead eyes from slueing.

What are ratlines?

Small hemp lines hitched across the shrouds, parallel to the sheer pole, to form a ladder for going aloft.

What is a sheer ratline?

Every fifth ratline ; it extends to the swifter to steady it.

What is the swifter?

The forward shroud.

YARDS AND MISCELLANEOUS.

What are jackstays?

Rods of iron secured along the top of yards, for the sails to be bent to and for reefing. Reefing jackstays are sometimes of wire rope rove through eye bolts on the top of the yard, but iron reefing jackstays are better.

What is a foot rope?

The rope hanging under a yard for the men to stand on.

What are stirrups?

Short pieces of rope hanging from the yard, to which the foot rope is seized. Foot ropes no longer reeve through the stirrups.

What is a flemish horse?

The outer or short foot rope, it fits over the pacific-iron on the yard arm, and the other end is seized to the outer quarter of the yard.

What are pacific irons?

Iron fixtures fitted on the extreme end of both fore and main topsail, and fore and main yard arms ; it has a square end for the outer boom iron, and the outer end of the flemish horse fits over it.

What are boom irons?

Metal hoops or rings on the lower and topsail yards, to support the studding sail booms.

What is a parrel?

A rope collar encircling the mast and attached to the

jaws of the yard, it confines the yard to the mast, but permits it to move up and down.

What is a parrel lashing?

The lashing between the two eyes of a parrel, abaft the mast.

What is a preventer parrel?

It is fitted on topsail yards only, and is of wire. It goes around the starboard slings of the yard, then around the mast and around the port slings of the yard, the two eyes being seized together, and to the jaws, between the mast and the yard.

What is a truss?

A heavy iron fixture by which the centre of a lower yard is held in its position at the mast.

What are the slings?

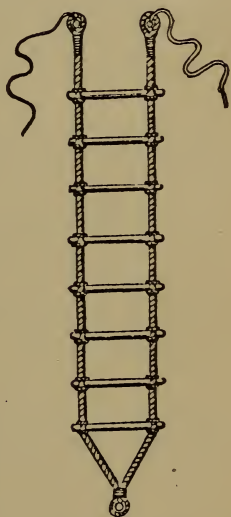
A short chain going around the lower mast head and connected to the yard by a slip bolt or pelican hook.

What is a Jacob's-ladder?

A short ladder with wooden or iron rungs and rope sides, used for getting into the lower rigging, and in going from the topmast cross-trees to the jack; also for stern ladders, boom ladders, and lower mast ladders, cap ladders, etc., etc.

What are cat-harpins?

Short wire ropes with thimbles in each end, used, with lashing eyes, to bind in the topmast rigging in wake of



JACOB'S LADDER.

the topsail yard when it is hoisted ; it also counteracts the drag of a lee lift when topsails are reefed.

What are the "eyes of the rigging?"

The parts that go over the mast head.

What advantage has wire rigging over hemp?

It is neater, lighter, not so perishable, and does not stretch so easily.

Point out all the standing rigging, and the fittings described.

CHAPTER V.

MARLINE-SPIKE SEAMANSHIP.

An apprentice can learn very little marline-spike seamanship from descriptions. Only general ideas can be gained. The best, and in fact the only way to become perfect in this most important branch of a seaman's education, is to take a marline-spike on deck and under the eye of a petty officer or seaman, try to attain perfection by constant practice.

It is not proposed to give a description of the knots and splices, but simply to give their general uses in connection with the cuts.

What does marline-spike seamanship comprise?

Knots, splices, clinches, seizing, etc., etc.

What is splicing?

Joining ropes together for different purposes, by uniting their strands in particular forms. The spliced part is slightly weaker than the main part.

What is seizing a rope?

Binding the two parts of a rope together with spun yarn, marline, or small stuff.

What is a round seizing?

A round seizing has riding or cross turns.

What is a flat seizing?

A flat seizing has *no* riding turns.

What is an eye or throat seizing?

A seizing of one or two parts of a rope that cross to form an eye.

All seizing stuff should be well stretched before using.

What is worming a rope?

Filling up the divisions between the strands (called the lay), by passing spun yarn or other material along. This renders the surface smooth for parcelling. Worming, in length, is about once and a half the length of the rope to be wormed.

What is parcelling a rope?

Wrapping strips of old, well-tarred canvas around it, with edges overlapping, like shingles on a roof, to shed the water. (For wire rope use sheeting, coated with red lead and boiled linseed oil, instead of tar). This prepares the rope for serving and protects it from rain.

What is service for?

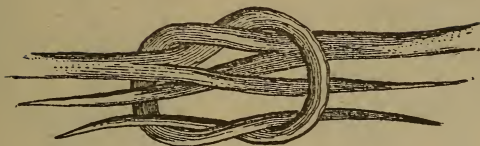
It is put on to protect the rope from chafe and from the influence of the weather. It is always passed against the lay of the rope. It binds the worming down together, and gives the whole the appearance of a well rounded rope.

“Worm and parcel *with the lay*, serve and marl the *other* way.”

Splicing an eye in a wire rope.

Wire requires more end for splicing than hemp. Stick the whole strand *once* under *two strands*, once *two-thirds* under *each* strand, and once *one-third* under *each* strand. This will make a good taper. Then set it up and stretch it well, beating the yarns well into place and breaking them off close to the rope, by working them backwards and forwards two or three times, or with nippers. Then red lead parcel and serve over with spun yarn. To assist in tucking each strand, a hammer or light maul is used, to *beat* the strand down into place. When splicing heavy wire, two men will be needed to make a neat splice.

KNOTTING.



A rope yarn knot.

Used in bending rope yarns together.



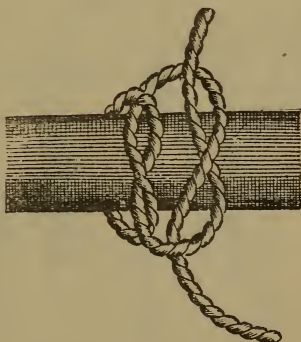
An over-hand knot.



A figure-of-eight knot.

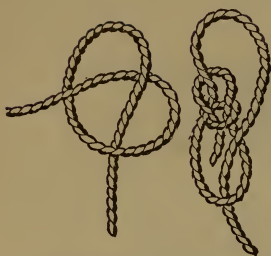


A bowline knot.



A reef or square knot.

Used in tying reef points and small stuff generally. Also used for bending ropes together.

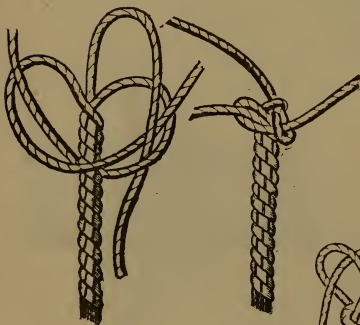


A running bowline.

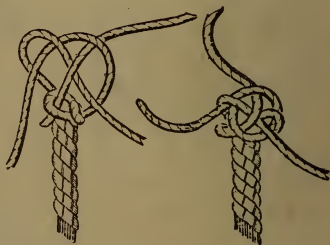


*A bowline on the Bight of a rope.
("Bowline on a bight.")*

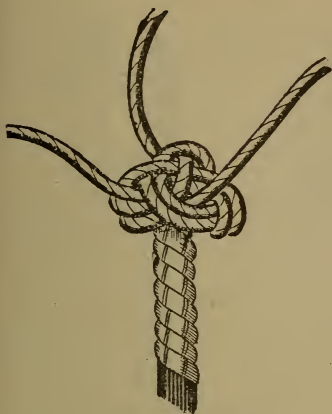
Used to sling a man over the side.



A wall knot.



A single wall and single crown.



A double wall and single crown.



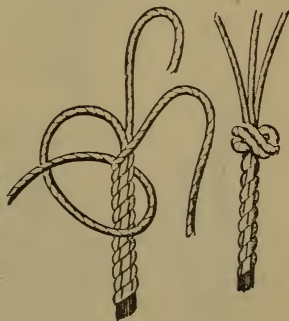
*A double wall
and double crown,
or "man rope knot."*

Used for the ends of
man-ropes, and for deck
stoppers.



A single Matthew Walker.

Used for bucket ropes.



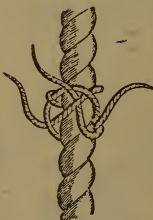
*A Matthew Walker's
knot.*



A single diamond knot.



A double diamond knot.



Turk's head worked into a rope.



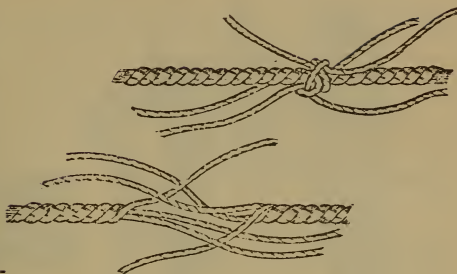
"Turk's head," (different stages.)

Turk's heads are used on foot ropes, grab ropes, etc., etc., etc.



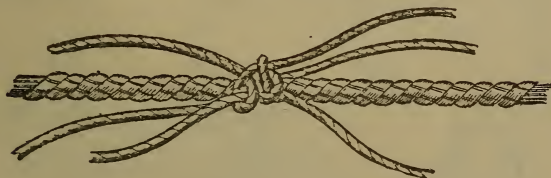
A stopper knot.

Used for temporarily securing the roping of a sail when carried away.



"Shroud knot."

Used when a shroud is shot, or carried away.

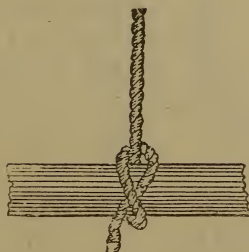


A French shroud knot.

HITCHES.



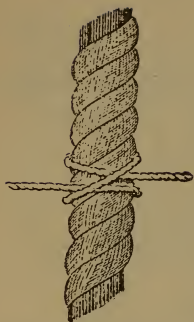
A half-hitch.



Half-hitch around a spar.



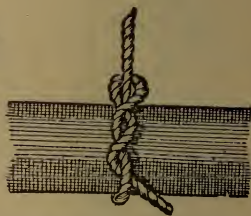
Two half-hitches.



*Clove hitch with a
ratline around a
shroud.*



A timber hitch.



Used for securing the end of a rope to a spar.



A timber and half hitch.

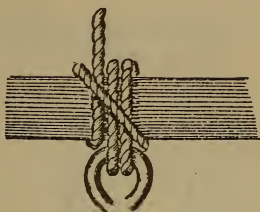
Used for bending a line to a spar, for towing, hauling anything into the tops, etc., etc.

*A round turn
and half hitch.*

Used for bending a line or hawser to the ring of an anchor.

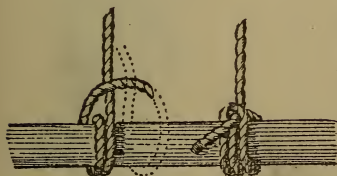


*Two round turns and
two half hitches.*

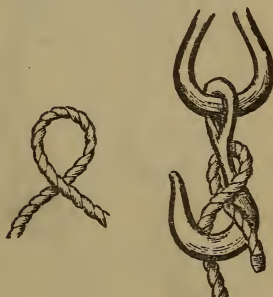


A roband hitch.

To hang an anchor to a spar.



Rolling hitch.

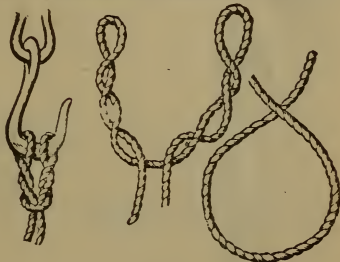


Blackwall-hitch.

Use 1 for hooking a tackle to a rope.



Double Blackwall-hitch.



"A cat's paw."

Used for the same purpose
as a *Blackwall-hitch*.



A sheep-shank.

Used for shortening a rope.



A midshipman's hitch, or a back half-hitch.

A good hitch for a stopper, and is much used on board ship.

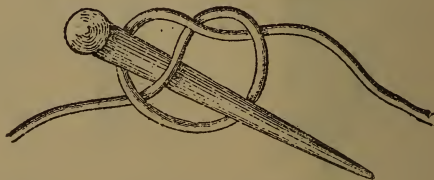


A marling hitch.

Used for making selvage straps, lashing hammocks, marling over parcelling, etc., etc.



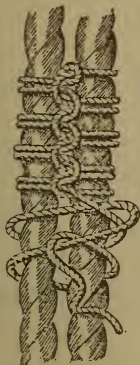
Hitching the end of a rope.



A marline-spike hitch.

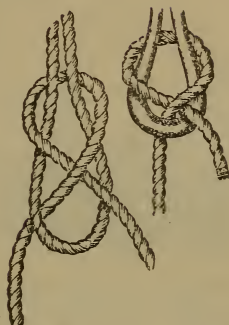
Always used in heaving on seizings.

BENDS.



“Kackling.”

Used to prevent chafe.



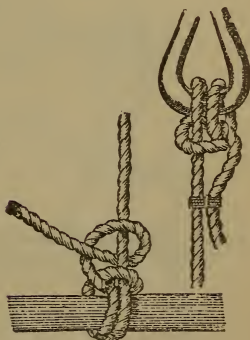
Single or sheet-bend.

For bending ropes' ends together.



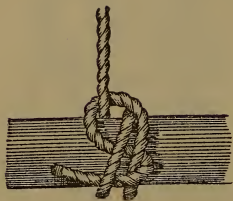
A double bend.

Used the same as “*sheet bend.*”



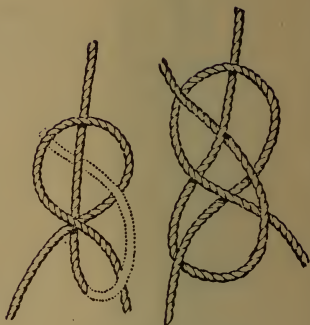
Fisherman's bend.

For securing a hawser to the ring of an anchor, or to a spar



"Studding-sail-halliard bend."

Used for bending halliards to the yards.



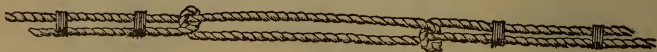
"Carrick bend."

Used for bending hawsers together.



Half hitch and a seizing.

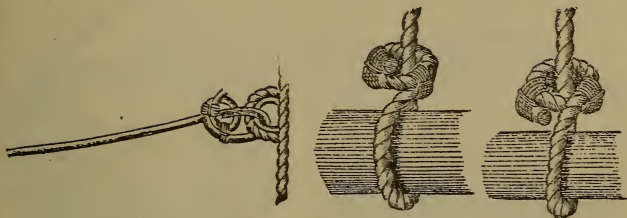
Used to bend hawsers together.



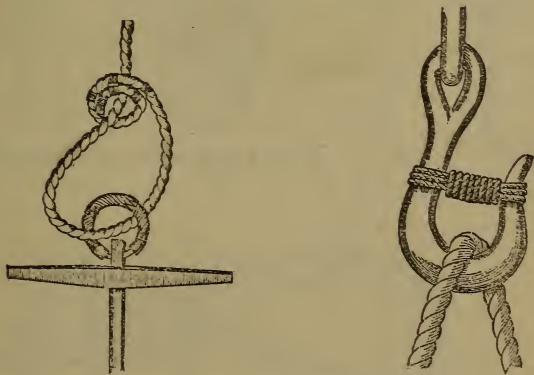
Reeving line bend.

Used for bending small hawsers together.

CLINCHES.



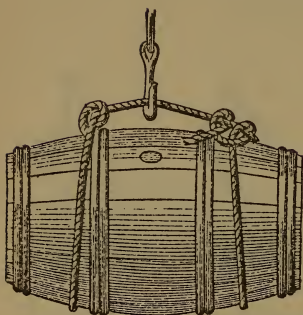
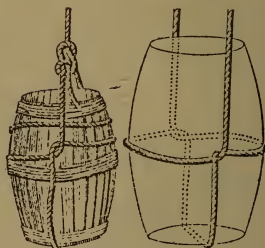
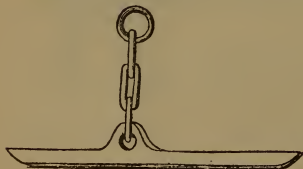
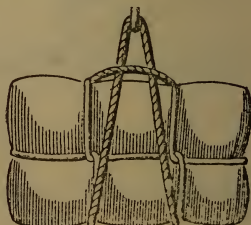
A clinch in a cringle. An outside clinch. An inside clinch.



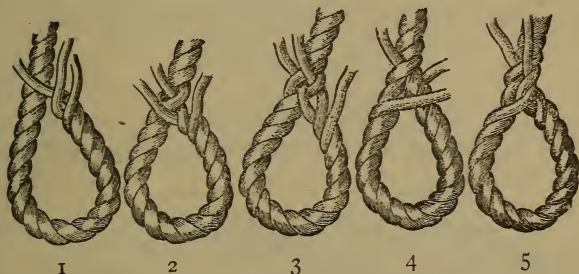
Hawser bent to an anchor with inside clinch.

Mousing a hook.

SLINGS AND HOOKS.

*Hogshead slings.**Can-hooks.**Sling a cask with a rope's end, with a guy bent on.**Sling a cask with head knocked in, 1st and 2d method.**A tank toge's.**A barrel or bale sling.*

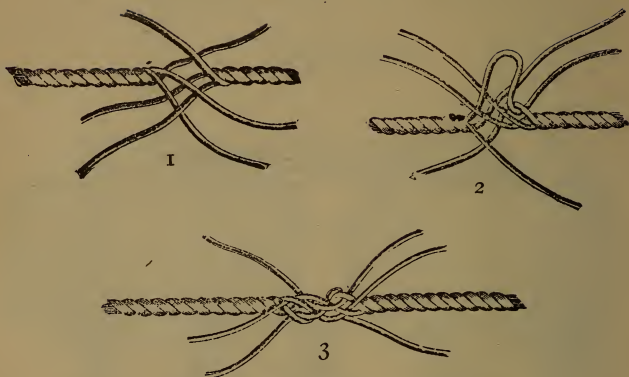
SPLICING.

*Marline spike.**Eye splice, (different stages.)*

No. 1 strands unlaidd ; No. 2, first tuck ; No. 3, second tuck ; No. 4, the *eye turned* ; No. 5, third and last tuck. Used for the eye of single ropes.

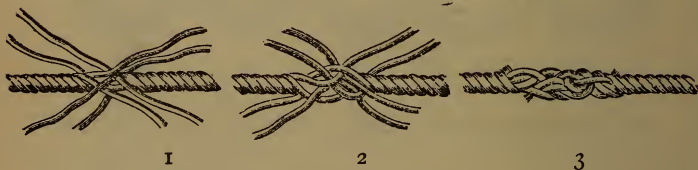
*Eye splice.*

Four-stranded rope.

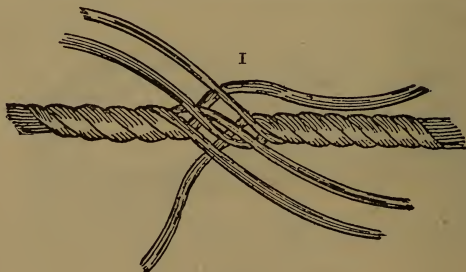


Short splice, (different stages).

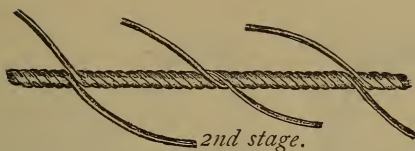
Used for joining ropes when strapping heavy purchase blocks, etc., etc.



Short Splice, (four stranded rope).



1st stage.



2nd stage.

1st method.



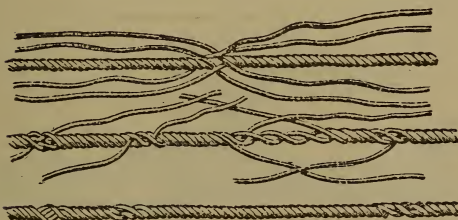
2



2nd method.

Long splice, (different stages).

Used for splicing running rigging.

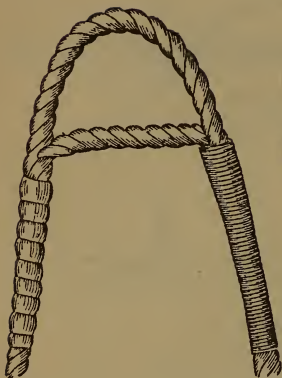


Long splice, (four stranded rope).



Cut splice.

Sometimes used for burton pendants, launches rigging.



Horseshoe splice.



Strand of a rope chafed.

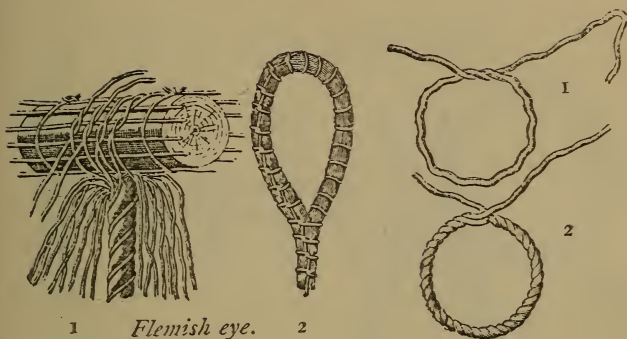
The chafed part is cut out, and a strand laid in its place; stick the ends as in a splice.



Splicing a rope to a chain.



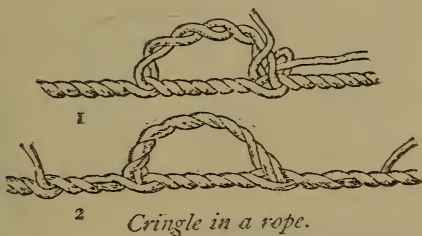
A selvage strap with marline hitches.



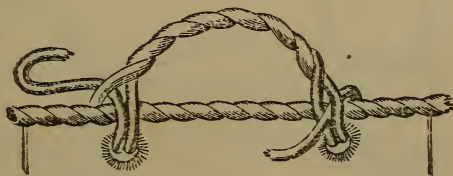
1 *Flemish eye.* 2

Grommet.

Used for block straps.

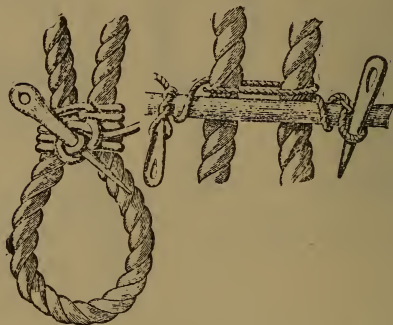


2 *Cringle in a rope.*



Cringle in a sail.

SEIZINGS, ETC., ETC.



1

2

Spanish windlass.

No. 2, the same, finished with a marline-spike hitch.

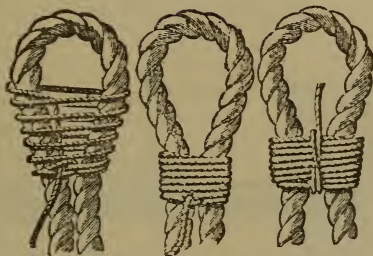
*Throat seizing.**Throat seizing with a round seizing.*



Racking seizing.



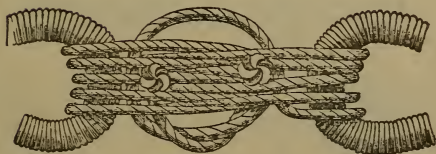
Cuckold's neck, or half-crown.



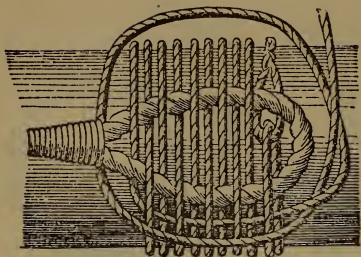
I 2 3

"Round seizing."

1st, 2d, and 3d stages.



Rose seizing.

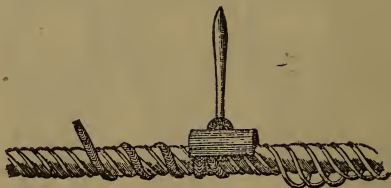


Rose lashing.

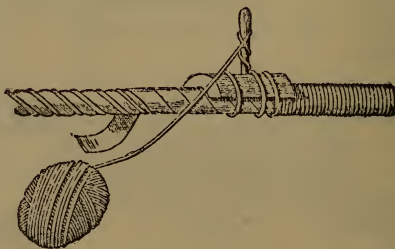
Used for seizing on the foot ropes of light yards.



Nipping two parts of a rope together.



Worming a rope.



Parcelled and serving.



Whipping a rope.

To prevent the strands unlaying and fagging out.



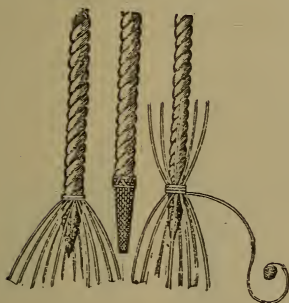
A serving mallet.



Serving board.

Used for small jobs.

MISCELLANEOUS.



To point a rope. (The different stages.)



Pointing a hawser.



1



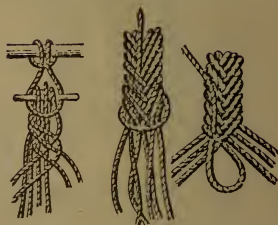
2

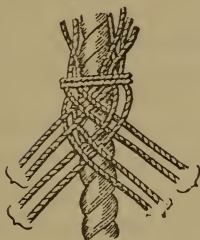
Cross pointing.*French Sennit.*

1

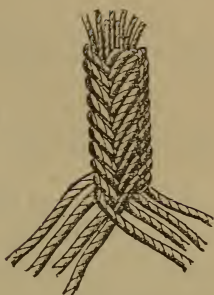


2

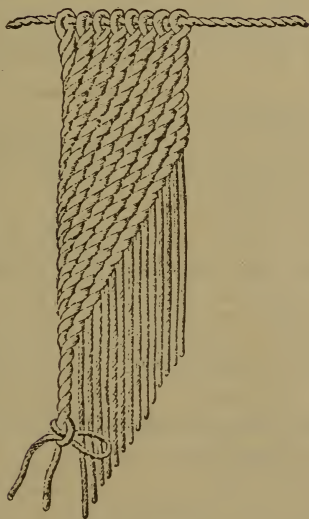
Sennit gaskets.
1st and 2d stage.*Common sennit.* (Three stages.)



Round sennit. (Two stages.)



Square sennit.



Paunch mat.

Used for chafing mats, in the rigging.

CHAPTER VI.

BOATS.

Ship's boats are either carvel, clinker, or diagonal-built. In carvel-built boats the planking does not overlap, but makes flush seams (smooth seams) which are caulked. In the clinker boats, the lower edge of each plank (or strake) overlaps the upper edge of the plank below, like shingles on a roof. In diagonal-built boats the planking is double and runs diagonally, the inside planks running in an opposite direction to the outside planks, and their edges meeting.

Boats have a keel, ribs (or frames), knees, stem, and stern-post.

What is a catamaran ?

The name usually given to the scow, balsa, or boat, used when cleaning the ship's sides or copper.

How are boats shaped ?

Either square-sterned, round-sterned, or sharp at both ends; in the latter case they are called whale-boats.

What is the "run of a boat ?"

The curve of the after part of the body of the boat. A *fine run* is a sharp slope or curve. A *full run* is a full curve.

What is the "entrance ?"

The angle which the bow makes with the water.

What are the thwarts ?

The seats for the crew.

What is the fore-and-aft thwart ?

The piece running fore-and-aft in the boat, with holes in it for the masts.

What are foot-links or bottom boards?

The strips, running fore-and-aft, in the bottom of the boat.

What is the rising?

The strips, running fore-and-aft, on the sides, that the thwarts rest on.

Where are the stern-sheets?

The space between the after thwart and the back-board.

What is the back-board?

The board across the stern sheets, to support the backs of passengers and also to form the coxswain-box.

What is the coxswain-box?

The space between the back-board and the stern; it generally has a small seat on each side, for the coxswain when steering the boat.

Where are the fore-sheets?

The space forward of the *forward thwart*.

What is the body of a boat?

That part included between the *stern-sheets* and the *fore-sheets*.

What are rowlocks?

Spaces in the wash-strake for the oars. Metal rowlocks are sometimes used, working on a swivel; they fit into composition plates having small holes in them; these plates are set into the gunwale of a boat.

What is the wash-strake?

The broad, thin plank which is fastened on the gunwale of a boat, to keep the spray and water out.

What is the gunwale?

The upper edge of the sides.

What are shutters?

Pieces of wood made to fit in, and fill up the rowlocks; used when under sail.

What is a stretcher ?

A foot piece, for an oarsman to brace his feet against when pulling.

What are boat-falls ?

Tackles used, at the ends of the davits, to hoist the boats.

What are boat-stoppers ?

Ropes made fast to the davit-heads, long enough, with end to spare, to reach the water ; used to take the strain while the falls are being belayed.

What is a strong-back ?

A small spar lashed on top of, and across, each pair of davits ; the gripes are made fast to it when the boat is secured for sea.

When is a boat single-banked ?

When it has but one oarsman to a thwart, pulling but one oar.

When is a boat double-banked ?

When it has two oarsmen to a thwart.

When are oars double-banked ?

When each oar has two men pulling it.

How are boats classed in the navy ?

Steam launches, steam cutters, sailing launches, cutters, barges, gigs, whale-boats and dingies.

What are their uses ?

Barges are reserved for flag-officers ; gigs for commanding officers ; the other boats are for the ship's use.

Boats are propelled by steam, electricity, sails and oars.

Rudders are shipped on the stern-posts of boats, by means of pintles (hooks) and gudgeons (iron eyes), they are also made fast to a boat by means of a small laniard from the rudder to the stern ; this is to prevent their being lost in case they should become unshipped from the stern-

post. A tiller, to move the rudder, ships into a hole in the rudder-head, and is usually worked by hand, although steam launches connect their tillers, by tiller ropes, with a small wheel placed in the bows of the launch. Gigs, whale-boats, dingies, and other small boats, generally use a yoke to move the rudder; this *yoke* has two arms projecting, one, on each side of the rudder-head. The centre of the yoke ships *on top* of the rudder-head, and two lines, called *yoke ropes*, are connected to the outer end of each arm, and lead in to the stern sheets. The rudder is moved by means of these *yoke ropes*.

Boats should have their own recall and the *general recall*, plainly painted in the coxswain-box.

The rules of the road apply to boats as well as to ships.

In using the rudder, *with the boat going ahead*, if the bow is to go to port the rudder is put to port, and the tiller or helm to starboard and *vice versa*. *With the boat going astern*, the helm must be put in the opposite direction to that in which it is put for going ahead. Do not place too much dependence on the rudder steering a boat going astern.

What are oars, for the navy, made of?

Ash.

What are the parts of an oar?

The blade and the loom. The flat part that is dipped in the water is the *blade*, the part inboard is the *loom*. The inner end of the loom is shaped to be grasped by the hand, and is called the handle. Oars are leathered where they take the rowlocks, to prevent chafe.

What gear is a boat supplied with, for ordinary duty?

A full set of oars and two spare oars, boat hooks, fenders, a full set of stretchers, two awning stanchions, a breaker

of water, anchor, lazy painter (or line for making fast), colors, awnings, cushions, etc., etc. Masts, sails, and compass are to be carried if ordered; the plug should be secured by a laniard.

What is "calling away" a boat?

Sounding a call, or passing the word* for the crew to man her. Boats are called away by the pipe (and passing the word) and by the bugle.

LOWERING AND HOISTING.

It must be remembered that in lowering and hoisting boats, the object is to take such precautions, that the lives of the crew will not be endangered, and that the boats themselves will not suffer injury. Lowering and hoisting, particularly at sea, or in a strong tideway, is a very important part of the proper handling of boats.

How is a boat lowered?

See the falls clear for running, the rudder shipped, plug in, and everything in readiness. A sufficient number of the crew in the boat to manage her.

At the order "LOWER AWAY!" the boat is lowered, by the falls, steadily and squarely into the water. The men in the boat should use boat hooks, to bear her clear of the guns and ship's sides. As soon as the boat reaches the water, unhook the falls, and hook them to bolts in the ship's side, underneath the davits. The men on deck hauling taut and coiling down the falls.

If in a tideway *always* unhook the *after fall* first, and attend the rudder, otherwise the boat might swing around and swamp.

When lowering a *stern boat*, particularly in a tideway, *always unhook the stern tackle or fall first*, and attend the

rudder; should the stern fall not unhook readily, better let it unreeve at once, she will then swing around with the *bow fall fast* and come "bows on" to tide or sea.

If lowering a stern boat in a *strong tideway*, it is better to use stout runners, fitted for the purpose; the runners are hooked, hauled taut, and belayed; the regular falls are then unhooked. When lowering, lower by the runners, and when the boat strikes the water, allow them to unreeve from on deck, and the boat will sweep clear of the ship. The runners are then hauled in and coiled down neatly in the boat. In lowering a stern boat, *never get her broadside on*, if it can be avoided, for in that position she is more than likely to swamp.

When under weigh, or in a strong tideway, and lowering a quarter or waist boat, have a line fast, from well forward, to the boat's bow next the ship's side. As the boat is being lowered, the crew are to hold on to the life lines.

Never lower a boat if the vessel is going astern, much better to be going ahead, but, if possible, wait until the vessel is stationary, or nearly so, before lowering.

In case a boat is to be lowered while underweigh, one fitted with a detaching apparatus is used, if possible. Usually two boats, one on each side, are so fitted for vessels of the navy. By this apparatus, the lower blocks of the falls are detached (when near the water), and the boat is dropped clear.

How is a boat hoisted?

The boat is hauled under the davits, the falls, having been overhauled down, are hooked, manned, and set taut. When all ready, "HOIST AWAY!" and walk her up to the davits. As the boat rises, one man in the bow and one in the stern, should reeve the stoppers through the rings or

slings, and take in the slack all ready to pass them before the falls are belayed. Others, in the body of the boat, use book-hooks, etc., to fend her off from the guns and the ship's side.

If in a tide or seaway, *have a line fast to the bows from forward*, hook the *forward tackle first*, and attend the rudder. As each tackle is hooked, the lower-blocks should be held *taut up*, by the standing part of the fall to *prevent unhooking*. Cross the life-lines and keep them taut through the bow and stern rings (this will prevent the fore and aft swing after the boat leaves the water). As an extra precaution, when the vessel has headway, have a stern line taken to the quarter. When the boat is rising, bind her by steady-lines from the ports or rail. The crew must also use boat-hooks to fend off.

If hoisting a stern boat in a strong tideway, *hook the bow tackle first*, and *do not* hook the stern tackle until all is ready for hoisting on deck. If both are hooked, at the same time, it will bring the boat broadside on to the tide or sea. When the boat rises, *hold hard* by the life-lines as she flies forward.

It is often difficult to get hold of the stern tackle of stern boats; after the bow tackle has been hooked, they should be overhauled down into *the bows* of the boat, and passed *aft*. When all ready on deck, haul the boat up gradually and hook quickly. The men in the boat use boat-hooks, as she rises, to fend off from the stern. Small spars can be held down from the stern-rail, between the boat and the vessel. The plug should be taken out the moment a boat leaves the water.

How is a boat-stopper passed?

Take it through the ring (or slings) in the bow and stern,

and, with the bight, pass two or three turns around the davit-head, *binding the hauling part* of the boat's falls. Then take a few turns around both parts of the falls, between the blocks.

What are life-lines ?

Lines made fast along the spans and guys of boat davits, for steadying the boat when hoisting and lowering, and affording a ready means for the crew getting out of the boat.

What is done when a boat is called away ?

If the boat is hoisted, the crew lay aft, and lower at the order; hauling to the gangway and manning her, or hauling out to the booms or astern, whichever is ordered.

If the boat is riding astern, or at the booms, the crew *man her there*, and haul or drop to the gangway and wait for orders.

When called away, every member of a boat's crew should *start at once*, moving on the run, and man the boat. On getting into the boat take the proper seats quickly and quietly; the stroke and bow oarsmen standing by with boat-hooks. The after-thwarts are for the stroke, and the forward-thwarts for the bow oarsmen. The remainder of the crew, are distributed, on the thwarts, in the body of the boat.

When distributing a crew in the boat for pulling, a coxswain should select as stroke oarsmen, the two most skillful oarsmen in the boat. Bow oarsmen should be light, active, and intelligent. The heaviest men should be distributed in the body of the boat.

During the temporary absence of the coxswain, the starboard stroke oarsman is in charge, and responsible for the boat and crew.

ORDERS USED BY PERSONS IN CHARGE OF BOATS.

The following orders are those most generally used by officers and others in charge of boats. A cutter, for example, is supposed to be lying alongside, properly manned, and ready to shove off.



UP OARS!

The crew, with the exception of the bow oarsmen, seize their proper oars, and, watching the stroke oarsmen, raise them briskly “up and down” together, holding them thus directly opposite the front and centre of their bodies, *blades fore-and-aft*, those on the starboard side with the right hand, and those on the port with the left hand down and grasping the handles. The oars to be held by the hands alone, *not resting on the bottom of the boat*, the crew facing squarely aft and paying strict attention to the coxswain.

Bow oarsmen stand up facing forward, and attend the painter or heaving line, or handle boat-hooks as the case may be. They should not raise their oars until the order “*let fall*” has been executed.

In a sea way or strong tideway, the after-oarsmen do not raise their oars, at "*up oars*," but assist with boat-hooks in shoving off, and raise their oars together and before the order "*let fall*."

At the command "SHOVE OFF!" bow oarsmen cast off painter or heaving line, handle boat-hooks, and shove the bow clear by a vigorous shove, the coxswain seeing that the ensign staff and quarter goes clear of the gangway, assisted by after oarsmen if necessary. In "shoving off," be careful not to mar or score the paint work on the ship's side with the pointed end of the boat-hook; reverse the boat-hook and shove off with the butt.

In shoving off from a vessel going ahead, always *shove off the stern* of the boat (supposing the boat is to lee-ward of the vessel), then as the vessel passes ahead and clears, the boat will be bows on to the wind and sea.

When the boat is well clear of the ship or wharf the order is given "LET FALL!" The oars are *eased down into the rowlocks* together, and leveled or trimmed on the after oars. *The blades should not be allowed to splash* in the water.

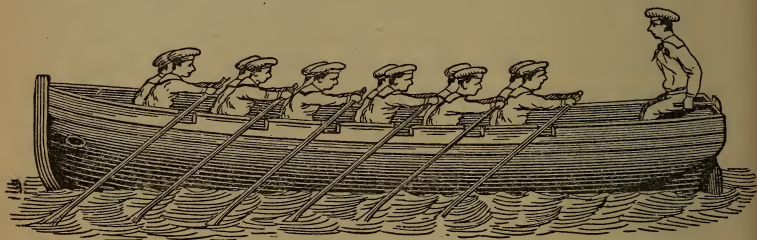
Take in the fenders. In double banked boats, each man is responsible for the proper handling of his own fender; in single bank boats No. 2 takes in and throws out the fender of No. 1, No. 3 that of No. 2, etc., etc.

The boat can now be pointed in the desired direction by ordering the proper oars to be backed or given way upon.

The bow oarsmen, having shoved the boat clear, turn aft, lay in their boat-hooks together, coil down the painter, if adrift, then take their seats, seize their oars, and looking at each other, throw their blades over the bows in line with the keel, together, and grasping the looms and handles,

raise the oars up and down, touch the blades and drop them into the water together.

When the boat is properly pointed, the command is given "GIVE WAY TOGETHER!"



The first of the stroke.

The starboard after oar gives the stroke, the others follow him. Each oar should be lifted as high as the gunwale, and feathered by dropping the wrist until the blade is flat, a brief pause being made when the oar is level with the gunwale, long enough to *feather* the oar. This is done to cut the wind and to avoid splashing in a seaway.

At the middle of the stroke each man throws *his weight*



The last or end of the stroke.

upon the oar. Never row hand over hand or from the shoulder alone, *but bend the back at each stroke.*

On approaching the desired place of landing, the boat being properly pointed, at the moment the oars *are leaving the water*, the command is given "IN BOWS!" The bow oarsmen, closely regarding each others' motion, *take one stroke*, toss their oars, raise them up and down, lightly touching the blades together, laying them fore-and-aft in the boat on the top of the thwarts and *without unnecessary noise*, the blades of the oars forward, the handles being shoved aft, and well out to the side of the boat, *underneath* the oars still in motion, taking care that *their oars are "boated."* They then seize their boat-hooks, stand up, face forward, and hold their boat-hooks up and down.

When with sufficient headway to reach the desired place of landing, the command is given "WAY ENOUGH!" As before, the command is given *while the oars are in the water*. The crew, regarding the motions of the stroke oarsmen, give one stroke, and, at the word from the starboard stroke, toss their oars together, raise them *up and down*, and lay them easily and without noise on top of the thwarts fore-and-aft in the boat, the blades forward and the oars out to the side of the boat, and to be so placed that they can be readily resumed by the crew, the stroke oars to be placed nearest the gunwale, and the others in succession, each oar being outside the one forward of it. The boat-hooks to be handled, so that the butt will not be *pointed towards any of the crew*.

The oars being boated, the stroke oarsmen, keeping their seats, handle their boat-hooks, and assist in bringing the boat to the landing.

After boating the oars the fenders are thrown out.

In saluting passing boats, in stopping to hail or to check headway, it may become necessary to lay on oars. To do this the command is given, "STAND BY TO LAY ON YOUR OARS!"

At this, pay strict attention for the command



OARS !

which is given while the oars are in the water, *the stroke is finished*, and the blades of the oars are feathered and raised together as high as the gunwale, where they are firmly held and trimmed (or leveled) on the stroke oars. *On no account are the oars to be allowed to touch the water, or to be thrown out of line.*

At the order "GIVE WAY!" the pulling is resumed, taking the stroke as before from the stroke oars.

To toss the oars, the command is given, "STAND BY TO TOSS!"



TOSS !

which is given while the oars are in the water; *the stroke is completed*, and the oars are thrown *up and down together*, blades *fore-and-aft*. Each oar is held square to the front of the man holding it, on line with the centre of the body

To trail, the command is given, "STAND BY TO TRAIL!" "TRAIL!"

At the second order, the oar is to be thrown out of the rowlock and allowed to trail alongside, either by the trailing line, or by holding the handle.

To stop the boat's headway, the order is given "OARS!" Followed by "HOLD WATER!" and if necessary "STERN ALL!"

At the first order, lay on oars as directed; at the second, *drop the blades into the water to check* the headway, and at the third, *back water*, keeping stroke with the after oars. The oars should not be dropped into the water too suddenly, or dipped too deep, lest they get broken.

To turn a boat suddenly, the order is, "GIVE WAY STAREBOARD (OR PORT), BACK PORT (OR STARBOARD)! OARS!" Both backing and pulling, oars should always keep stroke with the stroke oar of their own side.

Nothing can be more discreditable than a noisy, slovenly boat's crew. Therefore, keep perfect silence *at all times*; the coxswain (in the absence of an officer), is the proper person to give orders, and *he* will do the necessary talking. Pay strict attention to his orders, and obey them *with a will*. Boat the oars quietly, and see that when boated, they are so placed, that they will not roll around after the boat is hauled out or dropped astern.

The crews of running boats should be neatly dressed in the uniform of the day, and ready for inspection *by 8:30 a. m., and remain so* until the order to shift.

The rain clothes of the running boat's crew should be stowed where they can be easily reached. In rainy weather, coxswains should see each member of the crew provided with rain clothes before leaving the ship.

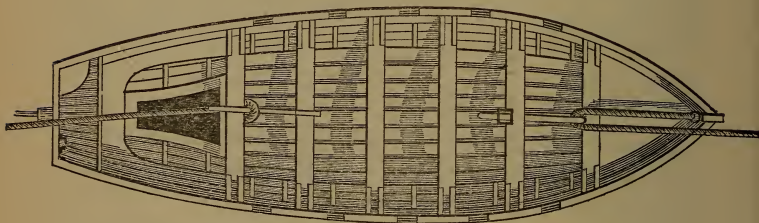
How is a boat steered in a heavy sea ?

An oar is shipped in a metal crotch, which is fitted to the stern of the boat. Whale-boats and surf-boats are usually so fitted.

What are muffled oars ?

Oars having pieces of canvas or thrum mats, wrapped around the loom in wake of the rowlocks, to deaden the sound of the oars while pulling.

How take a boat in tow ?



“ Giving and taking a tow.”

Pass well clear of her oars, and place yourself *ahead exactly in line*, give way as soon as you have the tow-line. Make fast the tow-line, to an after thwart, or a little forward the stern, so as to be able to bear it over the quarter to assist in turning.

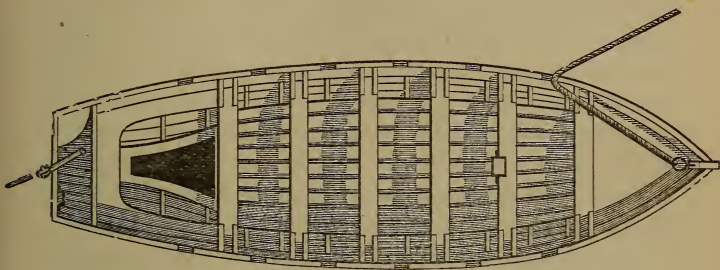
When several boats are towing, the heaviest boat should be *nearest* the tow.

Do not give another boat your painter until she is *right ahead*.

If towing a vessel on fire, a few lengths of chain (with a grapnel on one end) should be made fast to the vessel, and the tow-rope made fast to the outer end of the chain.

How tow a spar?

The *small end* first.



“ *Towing alongside a vessel.* ”

How receive a tow when alongside or astern of a vessel?

If alongside, take the tow-line from as far forward as possible, but if astern, take a short tow. Never *secure* the tow-line in the boat, but toggle it, or make it fast, so that it can be slipped quickly, should it become necessary. Do not allow other boats to hang on to you when being towed, the extra strain will endanger your stem or stern.

When being towed alongside, the tow-line is generally taken around the forward thwart, and the bight thrown through the forward rowlock (on the side near the ship), this insures towing clear, or it is sometimes taken from the bolt in the stem, through the forward rowlock.

In a strong tideway, how assist a boat to make the ship?

Make fast a good sized breaker or a couple of gratings (should one not be heavy enough), to a line, and float it

down to the boat ; the end being made fast to the boat, man the line, and walk her up.

How are boats kept clear of the ship when riding astern?

Make fast a bucket or grating to a line, and tow it astern of the boat. This is very often necessary at the change of tide, when the ship is wind-rod or held by an under current; the boat being so much lighter, naturally feels the effects of the surface current before the vessel, and so is frequently seen riding in an entirely opposite direction.

When a number of boats are made fast astern, what is the danger to a boat shoving off from the stern ladder?

Unless she is *veered astern* of all the other boats, she would probably get athwart hawse of some of them.

What precautions should be taken in leaving a ship in thick or threatening weather?

Have a compass in the boat ; before shoving off, if clear enough, take a bearing of the place you are going to. If not clear enough, take a bearing from the vessel's position on the chart, and compare the boat compass with the standard compass on deck. *The opposite* of this bearing will be the course back to the ship.

Take a bearing of your own ship on losing sight of her at night or in a fog.

What is bailing a boat?

Dipping the water out.

What is sculling?

Propelling the boat with a single oar rigged over the stern.

How are the crew notified to hook their boat on for hoisting?

By the bugle call, and also by the pipe and passing the word, for example ; FIRST CUTTERS, HOOK YOUR BOAT ON !

What is done at that order ?

The crew are to move *immediately on the run*. Three or four (who have been detailed), go into the boat, drop (or haul) her under the proper davits, and hook the falls. The rest of the crew lead the falls out ready for hoisting, the men are sent aft, the falls manned, and when all ready, SET TAUT! HOIST AWAY! the boat is walked up to the davits.

When hoisting a boat, avoid all stamping, whistling, singing out, or any unnecessary noise.

See the plug out, and the falls hauled aft and coiled down neatly.

When lying in a port where the water is at all fouled by sewage matter, or by anything tending to discolor the paint on the outside of the boat, boat-keepers should clean the boat as soon as she is up to the davits.

How are boats secured for sea ?

The davits are rigged in, stoppers passed, the gripes passed and set up. Spars, oars, boat-hooks, etc., etc., securely stopped and stowed in the boat, the hauling part of the falls are taken in and coiled down neatly in the bow and stern of the boat, unship the rudder of all but life boats, put on the boat covers (if ordered). The boat sails are usually unbent and sent below, the masts being stowed either in their own boat or on the booms.* Chafing mats are put on the boats and davits in the wake of the rigging, such as main sheet, etc., etc.

What are gripes ?

Broad bands made of sword mat, etc. They are fitted with thimbles and laniards and are passed around the body of the boat, when hoisted, then set up to the chains or rigging, binding the boat, to prevent swinging out and in.

How are life boats secured ?

* This seems to be the general custom, but properly, boat sails should be bent and kept stowed in the boats, at sea.

When at sea, they are secured so that they can be cast adrift without a moment's delay. A line is kept rigged from the boat's bow, next to the ship's side, leading well forward. The plug kept in, the falls clear for running *at all times*. The gripes are fitted with toggles or slip-hooks, so that they will be perfectly secure, and still can be cast adrift in a moment. The breaker is kept filled with fresh water, a bag of bread is stowed in the boat, a boat compass kept at hand, and everything must be so arranged that the boat can be cleared and lowered in a moment. Life lines should be secured to the davit spans and guys, and be long enough to reach the water. The oars and fittings must be complete, and a metal crotch, with a steering oar, is usually secured to the stern of the boat. The life boat (*at sea*) has a full crew, in each watch, of picked men. After a rain the plug should be taken out of a life boat, and replaced as soon as the water has run out; the sails should be well dried.

When is a steering oar used?

When a boat is pulling, head to wind and heavy sea; the rudder will then be of no use, from the stern being out of water part of the time, and from the boat having little headway.

In beaching a boat, through a heavy sea, why back the boat in?

The bows must be pointed out to take the force of the sea. The boat will rise much better at the bows, than she would at the stern, were she running, bows on, to the beach.

Why should not the stern of a boat rise equally as well to the sea, as the bows?

A sea striking a boat in the bows meets the body of the

boat, lifts it up, and being split by the bow, passes underneath. But on striking the stern, it finds the upright part of the *run*, and having nothing to take hold of to lift the boat with, it *must* pass over the stern and into the boat.

Why should you pull out to meet a wave as it approaches?

If in backing towards the shore, and the boat is allowed to have much sternboard when the waves overtake her, the sea will *raise the bows*, and, in striking that end of the boat first, give it more way than the stern, which is much below it; therefore, the boat must either run her stern under or *broach to* and capsize.

GENERAL REMARKS.

Applies to boats under sail and oars.

Keep clear of a ship with sternboard on. Should a boat get under a vessel's bow, she will be in danger of being cut down by the stem or dolphin striker.

Do not stand up in a boat, or sit on the gunwale. Never have arms hanging over the gunwale, nor the hands in the water alongside.

Trim the boat if under oars, that is, keep her on an even keel, with the weights amidships.

If in charge, remember that a loaded boat will hold her way longer than when light.

Always keep a boat "*bows on*," to a heavy sea.

Breakers of water, will make a safer ballast, than iron or sand.

If in charge, carrying stores, luggage, etc., etc., do not overload the boat. Keep the weights amidships.

If after sand, remember that *wet* sand is heavier than when *dry*. Be careful with the oars, the blades are easily ruined by throwing them on the stones, and treading on

them. Have the necessary number of shovels, buckets and tarpaulins in the boat before leaving the ship.

Stowing casks in a boat, keep them *bung up*, and leave plenty of space aft for bailing the boat out.

Have tarpaulins for covering such stores, as may be injured by salt water.

When loading, make large allowance for the roughness of water you may encounter.

If steering a boat, under oars, going alongside a vessel, make allowance for the tide, sea, etc., etc., and strive to bring your boat alongside the gangway, *gradually or easily*, and not with a *rush* and a *bang*. If steering a *barge or gig*, make a *long sweep*; an old rule was *to turn* when you could *see* the rudder-chains.

If passing under a low bridge, or under a weight that cannot be moved, should it require but a few inches to clear the gunwale, take out the plug and *sink* the boat the required distance, provided, of course, you are not loaded with stores that the water will ruin.

When getting into a boat, never step on the gunwale, but step in amidships.

Never smoke in a boat.

Never hail the shore, a ship, nor another boat in passing.

Never leave a boat without permission.

If sent in charge of a boat on duty to another vessel, report to the officer-of-the-deck on arriving; and on *receiving permission*, return to your boat and shove off at once, being careful to *clearly understand* the message to be conveyed, and the answer returned.

When boarding a vessel at sea, *always* board to *leeward*, and take a line of sufficient length to allow the boat to rise and fall with the sea.

DUTIES OF BOAT KEEPERS.

A *boat keeper* is in *charge of*, and *responsible* for the boat in the absence of the coxswain and crew. After the boat is lowered he is to see everything in order, bright work cleaned, cushions out, and covers on, colors ready for shipping, fresh water in the breaker, (this should be attended to before lowering the boat,) oars and stretchers in place. In fact, see the boat in perfect order for leaving the ship.

Follow the movements of the ship as regards spreading and furling awnings. He is never to *sleep, read or lounge around* in his boat; he is there *on duty* and must keep a bright lookout, see that his boat suffers no injury, and that passing officers are properly saluted.

When other boats are approaching or leaving the ship, he should go to the bow of his boat and haul her up out of the way. When his boat is *called away*, he must haul up to the boom, or to the stern ladder if astern, so the crew can man her.

In case the boat is to remain down during the night, the cars, spars, etc., etc., should be properly secured so they cannot roll around and disturb the people on board.

BOATS UNDER SAIL.

How are the masts stowed in the boat?

On top of the fore-and-aft thwart, the heel of the foremast stowing forward, and the heel of the mainmast stowing aft.

What is the regulation rig for boats in the navy?

The sliding-gunter, and sloop rig.

What is the sliding-gunter rig?

The masts consist of two sections nearly equal in length,

called the lower-mast and topmast. The latter slides upon the former, and is held in position by means of two iron rings, which are secured to the topmast, one at its heel and the other high enough above it, to secure sufficient support for the topmast when the sail is set.

How is the sail bent ?

It is *bent* to the topmast and *laced* to the lower-mast, in order to allow the topmast to travel freely. With this arrangement the spread of sail may be quickly reduced by lowering the topmast. Cutters have two of these sails and a jib, whale-boats have two sails and no jib, sailing launches are usually sloop-rigged, having one mast upon which are set a jib, mainsail, and gaff topsail. Dingies have a sail on one mast, no jib.

What other rig is used for ships' boats ?

The lug rig is the most used, it consists of two lug sails, the forward (or foresail) being the larger, and so cut that the forward part of the sail acts as a jib.

How make sail in a boat ?

If under oars, lay in the oars, see everything clear, halliards and brails rove off, sheets clear, etc., etc. Unship the flagstaff if shipped, and put the shutters in the rowlocks. Now step the masts *together*, set up the shrouds on each side, and ship the bowsprit. The jib tack having been previously rove through the hole in the *outer end* of bowsprit, take it through the thumb-cleat on the bow and set it taut; see the breaker and other movable articles well secured. When *all ready* "HOIST AWAY!" and make sail.

If the boat is head to wind, hoist the jib, and as she pays off *from* the wind on the proper tack, the halliards having been manned, hoist away the topmasts, and *then* haul aft the fore and main sheets (care being taken to have the topmasts *well up*).

If alongside a ship and not head to wind, pull well clear of the ship before making sail.

After making sail, see the halliards are coiled down clear for running, and *do not belay the sheets*, but take a *clear* turn around a cleat, and *keep them in hand*, so that they can be eased off quickly.

How douse sail and get under oars ?

See the brails, halliards, etc., clear for running. When all ready, "BRAIL UP!" LOWER AWAY TOGETHER! (the topmasts), unship the bowsprit. Take several turns with the brails around the sails and spars, making everything as snug as possible. Come up the shrouds, and when ready, *unstep and lower the masts together*. The foremast is lifted by the men forward, and the head received by the men aft; the mainmast being lifted by the men aft and the head received by the men forward. The bowsprit and jib are stowed on top of the fore and mainmast; the whole being secured on top of the fore-and-aft thwart; take out the shutters, the men take their proper thwarts and stand by to *up oars*; if proper, ship the colors. Should the boat commence drifting to any extent before the masts are down, get out a couple of oars on each side, amidships, to keep her in position.

When making or taking in sail, endeavor to keep *well down* in the boat.

What is tacking and wearing ?

Tacking a boat, is putting the helm down and luffing into the wind, finally bringing the wind on the other bow. Wearing a boat, is putting the helm up and running off from the wind, and finally bringing it on the other bow.

What is luffing ? Bearing up ?

Luffing, is putting the helm down and throwing the boat

sufficiently into the wind to shake the sails. Bearing up, is putting the helm up and running off from the wind.

Explain how to tack a boat ?

The order is given, **READY ABOUT !** When **all** ready, the helm is *eased down*, main boom hauled gradually amidships, and as the jib is about to lift, *ease off* the jib sheet. When nearly head to wind the jib may be borne out to leeward, *and aback*, to assist in sending the boat's head around, but with a smart-working boat this will not be necessary. When the wind is right ahead, **SHIFT OVER !** The fore and main sheets are shifted over, the fore sheet being *hauled aft* when the wind is a little on, what will be, the weather bow; the main sheet is *eased well off*. As soon as the foresail is full, **DRAW JIB !** the jib and main sheets are then hauled aft.

When tacking, boats are frequently sluggish in paying off from the wind with the jib sheet to windward, in consequence of the great pressure on the lee bow from leeway, the boat having little or no headway. The quickest way to get her to her course is to *draw the jib*, and slack off the main sheet; this will give headway, and prevents her stern from being driven to leeward, and consequently her bow falls off.

In tacking, supposing a boat gets sternboard, how do you make her bow pay off the right way ?

The helm is shifted for sternboard, but little dependence, however, can be placed on that method. Send all hands aft to the *old weather quarter*; the boat is then sure to pay off the right way, in consequence of the pressure of the water being more on the quarter *well down* in the water, than on the other quarter, and also her bow, being higher than the stern, catches the wind better.

The usual practice is to bear out the mainsail, but it seldom has the desired effect, in consequence of the wind in the sail depressing the *wrong quarter*. For example: the wind is ahead and it is desired to have the bow pay off to starboard. If the mainsail is borne out on the starboard quarter in the hope of sending her stern to port, it will likely have the opposite effect, as it will at once depress the port quarter, which then being the deeper, the water will act against it more than against the other quarter, and cause the stern to turn to starboard, even *against the mainsail*. The more she turns the more the mainsail will depress the port quarter and side of the boat; but if the men are sent to the starboard quarter and side of the boat, the stern is at once *forced to port*, and the *bow to starboard*, as desired.

Explain how to wear a boat?

Put the *helm up* and *ease off the after sheets*; when the wind is well aft "SHIFT OVER!" the sheets, taking in the slack quickly as the *sails gybe* (swing over). "EASE OFF THE HEAD SHEETS!" until the boat is close to the wind, then "TRIM AFT!" everything. If blowing fresh, the sails should be brailed up before *gybing*. In fact, the better practice is to brail up the mainsail just after putting the helm up.

How is weather and lee helm produced and avoided?

Weather helm is produced by trimming a boat by the head; lee helm, by trimming a boat by the stern; or, sending the men aft raises the bow, which being higher than the stern, the wind has more effect on it, and the tendency is to cause the bow to fall to the leeward. The reverse applies to sending the men forward.

If the sails are up taut, and *well trimmed*, by a proper distribution of the weights, the helm can be brought amid-

ships; dragging the rudder across the stern, deadens the boat's headway, therefore try and keep the helm amidships.

How do you reef a boat's sail?

Slack down the halliards, secure the forward eyelet of the reef-band well down, haul the foot of the sail taut along the boat and tie the reef points together with a reef-knot, being careful to have the slack sail as neatly rolled up as is possible, avoiding all dogs' ears (bights of sail hanging down near the reef earings). The reef being in, take a turn with the sheet, mind the helm, hoist the sail, trim aft.

How shake out a reef?

Ease the halliards and sheets, untie the reef points, cast off the eyelet lashings, and hoist away the halliards, trim aft the sheets.

What is done when hoisting the jib taut up?

Slack the fore sheets; the jib acts as a stay for the foremast, and the fore sheet pulls the head of the mast aft. Therefore, the sheet should be slacked to allow the mast head to go forward while the jib is being hoisted, then haul aft again.

Why is it dangerous to use lee oars when under sail?

In a squall, if the oars catch the water, the gunwale might be split, the oars broken, or the boat capsized.

If on the wind and the halliards require a pull, always *ease the sheets*.

What is meant by "wing and wing?"

In running before the wind the main sheet should be eased way off, the boom going out on the side that will be the lee side when the boat is brought "on the wind;" the foresail being boomed out by a boat hook on the opposite side.

Sailing on the wind and struck by a squall?

If the squall be light, *ease off the fore and jib sheets*, and *luff her*. If a heavy squall, let fly the head sheets, *hard down* with the helm, lower and brail up the sails.

Sailing with the wind abeam and struck by a squall?

Let fly *all sheets*, and, if necessary, brail up and lower the sails.

What precautions are taken when running?

Running dead before the wind is dangerous; particularly in a seaway; better bring the wind a little on either quarter; if in a heavy sea, sails or spars towed astern diminish the risk of being pooped. Remember before *rounding to* (bringing by or on the wind); that a boat cannot carry the same sail *on a wind* that she can *before it*, and reduce sail accordingly.

If caught in a gale and you cannot run?

Lash the spars, oars, and other gear together; make a span and secure it to the spars, bend a line to the span, get the spars overboard, and with as much line out as possible, ride to leeward of them.

How bring a boat alongside under sail?

A general rule is to keep the main yard *end on*, but everything will depend on the judgment of the coxswain, particularly in a tide or seaway, and whether a boat is light or laden. In coming alongside, see the brails, halliards and everything clear to *douse sail* before reaching the gangway. When *way enough*, OUT FENDERS! BRAIL UP! LOWER AWAY! RIG IN THE BOWSPRIT! bowmen and stroke oarsmen stand by with the boat-hooks. Take out the shutters; if so ordered, pass the brails, etc., around the sails and spars, unstep the masts together, make the sails up neatly, and put on the covers. If the boat is to be hoisted, get everything ready.

Should a vessel be "*hove to*," do not approach her if she has sternboard; wait until she gathers headway, *douse sail* and unstep the masts before going alongside, so as to be in no danger from her boats and guns.

Which is safer to enter broken water, under oars or sail?

Under oars, then the boat can be turned in any direction. Sails would be liable to get aback or becalmed.

REMARKS ON BOATS UNDER SAIL.

If sailing a boat, have the sails *properly set*; otherwise, she will be both unsightly and unmanageable.

Remember that the rigging helps the masts to *support the sails*, not vice versa, therefore, never set up the lee rigging *too taut*, or the mast head will be wrung off when you go about.

As a general rule, *reef* the moment a boat begins to take in water.

Get the wind out of a sail if you want to manage it.

Never sit nor lounge on the gunwale, stand on the thwarts, nor have arms nor hands hanging over the side, nor belay the sheets, nor let go the helm.

Keep the men out of the bows, and make them sit low down.

Keep all gear clear for running, ready to shorten sail at a moment's notice. This caution applies not only to boats *on the wind*, but to boats *before the wind*, for if running before a fresh breeze and "*brought by the lee*," you are almost certain to capsize if the sheets and halliards are not well in hand.

Remember there is always an eddy wind under the stern of vessels lying head to wind; frequently boats passing under the stern of large vessels are suddenly taken aback;

in such cases be careful to have all hands amidships, particularly if in a fresh breeze, and the crew have been up to windward.

Never climb the mast of a boat ; if anything is to be done aloft, unstep the mast. Many boats have been upset from neglect of this rule.

In tacking, do not put the helm down suddenly, *but ease it down*. Putting the rudder right across the stern deadens a boat's headway ; about three-quarters, either way, will answer every purpose.

Keep the boat bows on to a heavy sea.

If in charge of a boat, under sail, and the wind fails, *douse sail* at once, and get out oars ; do not drift around waiting for a breeze.

If a boat is swamped, all the crew should remain by her, as the boat will assist those who cannot swim.

If on a wind, and there is any doubt about weathering a ship or any danger, "*go about*." Never luff and shake the sails, as the boat losing all way through the water, will become unmanageable, and drift on to the danger you wish to avoid.

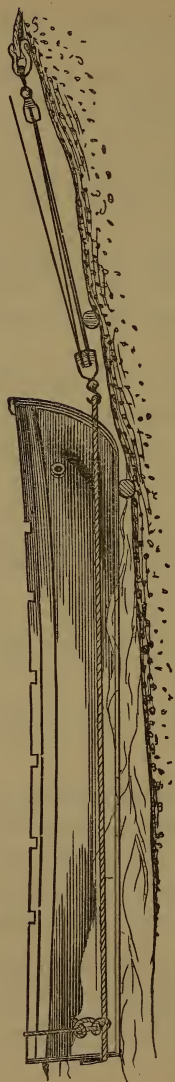
If out of water, twice a day dip your clothes overboard and put them on wet.

HAULING BOATS UP ON A BEACH.

A small boat can be hauled on the beach by placing stretchers under the keel.* Man both sides of the boat, and run her up. For a heavy boat, use tackles.

To haul up a cutter or launch.

Bury your anchor in the sand, keeping a man on it to hold it down ; hook one block of a tackle to the anchor, the



“HAULING A BOAT UP ON A BEACH.”

other block hook to a line passed around the boat close to the keel, hanging the line to prevent its getting under the keel. The tackle is hooked to the forward bight of the line

CHAPTER VII.

BLOCKS, BLOCK STRAPS, TACKLES, ROPE OR CORDAGE.

What is a block ?

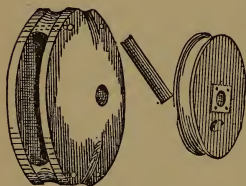
A flat, oval piece of wood, containing one or more sheaves.

What are blocks usually made of ?

Ash, elm, iron and composition.

How many parts to a block ?

Four. The shell, or outside; the sheave or wheel over which the rope passes, the pin or axle on which the sheave turns, and the strap which encloses the whole, resting in the scores.



How many kinds of blocks ?

Two. The *made* block, and the *morticed* block. These in turn are divided into common and patent blocks.

What is the made block ?

One in which the shell consists of two or more pieces pinned together, to make up the block.

What is a morticed block ?



The shell is composed of but one piece of wood, *morticed* (or hollowed) out to receive the sheave.

What is a common block ?

One in which the hole in the sheave is lined MORTICED (or bouched) with a composition of copper.
BLOCK.

What is a patent block ?

The hole in the sheave is bouched, and the bouching contains friction rollers. Used only when blocks are not subject to a great strain.

What is bouching?

A metal lining, to protect any part from chafe and wear.

What are the cheeks of a block?

The sides of the shell.

What is the swallow?

The hole through which the rope reeves.

What are the "scores?"

The notches cut on the sides and one end of a block, to allow the strap to fit in. There are single and double scores.

What are straps made of?

Rope and iron.

What is attached to the strap?

The thimble and hook.

What is the breech (or bottom) of a block?

The end farthest from the hook.

How do you tell the top from the bottom or breech?

The top is the end which has no score on top, and where the greatest space is between the sheave and the shell; the bottom is the other end.

What is the "becket?"

The small grommet spliced in the strap of a block, to which the standing part of the fall is sometimes made fast; it fits in the score, in the bottom, of the block.

How are blocks classed?

According to the number of sheaves; for example; single, double, treble (or three-fold), and four-fold blocks.

How are blocks measured?

By the length of the shell.

How do the sizes vary ?

From about 4 to 24 inches.

What is included under the general term of blocks ?

Hearts, dead eyes—bull's eyes, wooden thimbles, fairlead-ers, euphroes (for awnings), rollers, chocks, etc., etc. These, however, are measured by their diameter.

How are blocks named ?

They take their names from the purposes for which they are used, from their form, or from the position they occupy.

What are bee blocks, or bees ?

Thick pieces of *oak*, bolted to the sides of the bowsprit, having heavy metal sheaves ; the fore-topmast stays reeve through them.

What is a cat block ?

A heavy, three-fold, iron strapped block, a large hook being fitted to the strap by a link. Used in catting the anchor.

What is a cheek block ?

A block having but one cheek. It is bolted to a mast or gaff, and they form the other cheek. Used on gaffs for brails, etc., etc.

What is a clump block ?

A short, thick, single block, sometimes with a metal sheave ; for example, the fore and main tack and sheet blocks.

What is a clew garnet block ?

A large, single, iron strapped block under the slings of the lower yards ; it acts as a leader for the clew garnet. This name is also given to the block at the clews of the sails, through which the clew garnet reeves.

What is a clewline block ?

The block at the clews of the topsail through which the clewline reeves.

What is a dasher block ?

A small block at the end of the spanker gaff, for the ensign halliards to reeve through.

What is a euphroe ?

A long piece of wood, with a number of holes in it, through which the crow-foot (for the awning) is rove.

What is a fiddle block ?

A block having two sheaves, one above the other, the lower sheave being the smaller ; used for burtons, yard tackles, etc., etc.



FIDDLE BLOCK.

What is a fly block ?

A double block, used as the upper block of topsail halliards. It hooks into the thimble of the topsail tye.

What is a gin block ?

A metal block with composition sheaves, used at the topmast head for the topsail tyes to reeve through. The small metal blocks used aloft for the top gallant and royal braces, buntlines, etc., etc., are also called gin blocks.

What is a girtline block ?

A single block, through which girtlines and single whips reeve.

What are hanging blocks ?

Blocks hanging at the mast heads for the halliards of jibs and staysails to reeve through ; they are single, iron bound, and fitted with friction rollers.

What are jack blocks ?

Blocks under the eyes of the topgallant and royal rigging, to reeve the topgallant and royal yard ropes through. They are convenient in sending up and down light masts, as it does away with the necessity of unreeving the yard ropes.

What is a jeer block?

A large treble or four-fold block through which the "jeer falls" are rove in sending up and down lower yards.

What is a jewel block?

A single block at the ends of the topsail and topgallant yards, through which the topmast and topgallant studding sail halliards reeve.

What are quarter blocks?

Strong, iron strapped blocks under the quarters of the yards. On the topsail and topgallant yards they are double, to give lead to the sheet of the sail above and the clewline of the sail below the yards—on the lower yards they are single for the topsail sheet; on the royal yards they are single for the royal clewline; on the light yards they are fitted with "*sister hooks*," so as to be easily detached. They are sometimes *treble* under topsail yards for the reef tackle to reeve through.



SHOE BLOCK.

What is a shoe block?

A single piece of wood with the sheaves placed at right angles to each other. They are used for buntline blocks and harbor

clothes-lines.

What is a sister block?

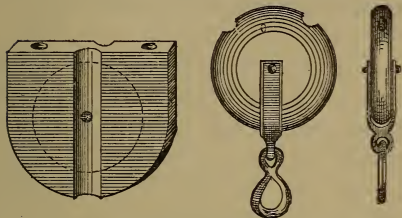
A double block with one sheave above the other. The shell is in one piece, thick and heavy; between the sheaves is a score for a middle seizing, and on the sides a score for the topmast shrouds. The block is seized between the two forward shrouds of the topmast rigging; the topsail lift and sometimes the reef tackle reeve through it. It is made of *lignum vitæ*, and has metal sheaves.



SISTER BLOCK.

What is a secret block?

A block open only at two holes, which are just large enough to allow the rope, which is intended to reeve, to pass through. It is so constructed to prevent small gear from getting into the swallow. It is used for clew-lines, clew-



SECRET BLOCK.

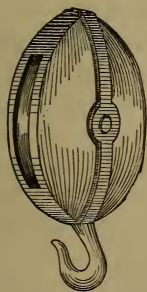
jiggers, reef tackles, etc., etc. The shell is made of lignum vitæ.

What is a snatch block?

A single block, iron strapped, swivel hooks. The shell has an opening at the breech that will admit the bight of a rope, doing away with the necessity of first reeving the end through. This opening can be closed by an iron clasp or clamp—much time being gained in leading such ropes as yard ropes, mast ropes, boat falls, etc., etc.

What is a telegraph block?

A pyramid of blocks, with small brass sheaves; used for making telegraphic signals, there being a sheave for the halliards bent to each separate flag used.



TOP BLOCK.

What is a top block?

A heavy, single, iron strapped block, hooked to the lower cap, through which the top pendant reeves in sending up or down topmasts.

What is a nib block?

A metal block having a rigid hook which causes the block to stand square.

What are span blocks?

Blocks seized into each bight of a strap that leads across a cap or mast-head, so as to hang down on either side.

What is a tie block?

A large, single, iron-bound block on the slings of a top-sail yard, for topsail ties to reeve through. With wire ties iron gin blocks are used.

What is a tail block?



Tail Block.

A block strapped with a long rope called a tail, used as a leading or whip block.

What is a viol block?

A large single block, with a swallow large enough to take a small hawser.



Common Strap.

Strapping Blocks.

How is the size of a strap determined?

By the purpose for which the block is to be used. The general rule is that the circumference of the strap should be one-third the length of the block.

What should be done with the rope before making a strap?

It should be well stretched.

What is the length of a common strap?

About once and a half around the block; this will allow end for the splice.

How is a strap passed before splicing?

Through the eye of the hook, around the thimble, then fit the strap to the block, and splice the ends.

Where should the seizing of the strap be put on?

Between the thimble and the top of the block.

Where does the splice go?

At the breech of the block.

How are straps preserved from chafe?

They are wormed, parcelled, and covered with leather or canvas, which is sewed on.

How are blocks measured for straps?

Under 12 inches in length they should be measured with a piece of spun yarn taken around the block in the score. Above twelve inches, measure in the same way, but use, instead of spun yarn, a piece of small stuff, as 6, 9, 12, 15 thread stuff, increasing with the size of the block.

What straps are longer than the common strap?

Straps of blocks intended for special uses; for example, the straps of fore and main lift blocks, if fitted with rope, are made long enough to go once around the yard. Blocks used for heavy purchases are *double strapped*—that is, a single strap doubled; and large blocks for heavy work, such as the “*main purchase blocks*,” have double straps, with eyes for toggling.

What other straps in use?

The *grommet strap*, which is a strap made of a grommet, the end being rove through the eye in the hook before the grommet is made; the single strap, with lashing eyes (which is used instead of the hook and thimble), the strap and pendant, etc., etc.

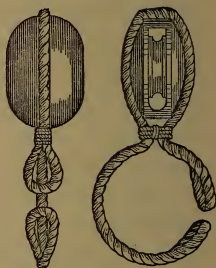
MEASUREMENTS OF STRAPS FOR CUTTING AND FITTING.

"Single block with lashing eyes."

Twice the round of the block, and once the round of the rope; this will give the length to cut the strap. Marry the rope once and a half the round of the block, and once the round of the rope.

"Single block with hook and thimble."

Measure twice the round of the block, and once the round of the rope, for length. Marry the strap

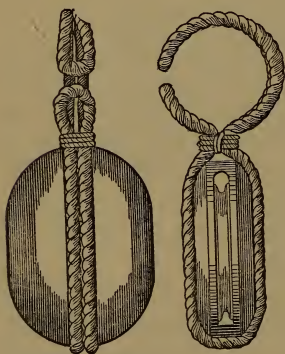


Lashing Eyes.

once the round of the block, the rope, and the thimble.

"Single block with double scores."

The length for a double strap passing around a yard and the bights, lashing on top of the yard. Measure twice and a half the round of the block, twice the round of the yard, and once and a half the round of the rope. Marry the strap at twice the round of the yard and block, and once the round of the rope.



Double Strap, with Lashing Eyes.

"Double block with hook and thimble."

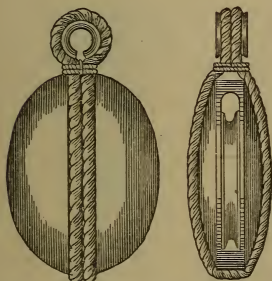
Take twice the round of the block for the length of strap. Marry it once the round of the block, once the round of the thimble, and two-thirds the round of the rope.

“Brace blocks for lower yards.”

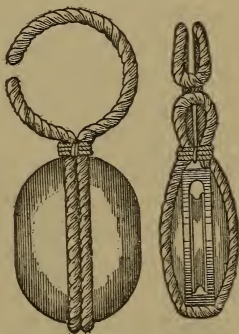
They are fitted with a double strap. Measure twice the round of the block, twice the round of the thimble, and three times the round of the rope; allow sufficient end to splice.

What is the general size of the ropes to reeve in blocks?

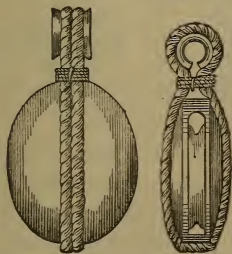
An ordinary block: take one-third ($\frac{1}{3}$) its length for the size of the rope to reeve; for example; a nine-inch block will reeve a three-inch rope.



Double strap and thimble.



Two single straps with lashing eyes.



Two single straps with thimble.



Strap and pendant.

How measure for a clump block ?

Take one-half ($\frac{1}{2}$) its length.

For a very thin block ?

Take $\frac{1}{3}$ its length.

For a fiddle block ?

Take $\frac{1}{6}$ its length.

“ TACKLES.”

What is a tackle ?

A combination of ropes and blocks, used as a power to move or hoist heavy weights.

What is the simplest kind of a tackle ?

A single whip ; it is a rope rove through a stationary block.

What block of a tackle should be hooked to the weight to be moved ?

If possible, the block which contains the greatest number of parts of the rope.

Why ?

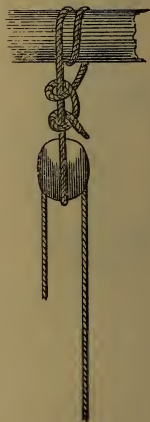
Because each part of a rope that is applied to a weight will increase the power to move it ; for example ; if a tackle having a block with two sheaves is applied, the power is just twice as great as if the block had but one sheave, etc., etc.

What is meant by the friction of a tackle ? *Single Whip.*

The amount of power that is lost, by the resistance of the rope or fall in passing over the sheave of the block.

How many principal tackles or purchases in general use ?

Five principal ones : the runner, gun-tackle purchase, luff tackle, two-fold purchase, and three-fold purchase. All other purchases are combinations or modifications of these,



and they are best names from the purpose for which, or the places where they are used.

What is a runner?

A single movable block and fall; the fall has a thimble spliced in the end for hooking a purchase to.

What is a gun-tackle purchase?

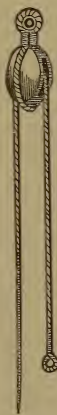
Two single blocks, the standing part of the fall being made fast to the block the hauling part leads from.



*Gun-Tackle
Purchase.*



*Two-Fold
Purchase.*



Runner.



*Luff Tackle
Purchase.*

What is a luff tackle?

A double and single block, the standing part of the fall being made fast to the single block.

What is a two-fold purchase ?

Two double blocks, the standing part of the fall being made fast to the same block the hauling part comes from, but is made fast to the opposite side of the block (from the hauling part) to keep it from canting.

What is a three-fold purchase ?

Two treble blocks, the standing part of the fall being made fast to the same block the hauling part comes from, but on the opposite side of the block (from the hauling part.)

What is a boom, or in-and-out jigger ?

Usually a double and single block, used to rig studding-sail booms in and out.

What is a boom tackle ?

A double purchase used on fore-and-aft vessels, to guy the main boom out over the quarter.

What is a deck tackle ?

A heavy double purchase, used for heavy work around deck, such as hauling in chain, etc., etc.

What is a fish tackle ?

A heavy double purchase, used on the fish boom or davit for fishing the anchor.

What is a fore-and-aft tackle ?

A tackle used in stretching the back bone of an awning. Any tackle is a fore-and-aft tackle, if used in a direction with the length of a vessel (or fore-and-aft).

What is a thwart-ship tackle ?

A tackle used across, or at right angles to the length of a vessel.

What is a Griolet purchase ?

A purchase used for dismounting guns on a covered deck. It is in two parts—the muzzle purchase and the breech pur-

chase. The lower block of the muzzle purchase is a short, cylindrical block of wood, one end of which fits in the muzzle of the gun, while sheaves are placed in the outer end. The lower block of the breech purchase is fitted with a shackle, to shackle in the jaws of the cascable of the gun. The upper blocks of both purchases are three-fold iron blocks.

What is a hatch tackle?

A small purchase, used to hoist articles up, and lower them down, through the hatches.

What are "jeers" or "jeer falls?"

A large heavy purchase, used for sending up and down lower yards. They are usually composed of large treble blocks.

What is a jigger?

A small luff. It is very useful around decks; sometimes the double block is strapped with tails, to clap on sheets, etc., etc.

What is a rigging luff?

A tackle composed of two single blocks, used in setting up rigging.

What is a stay tackle?

One composed of two double blocks, used in setting up stays.

What is a pendant tackle?

Two double blocks. It is hooked to the lower mast-head pendants, and is used when setting up rigging, steadying masts, etc., etc.

What is a reef tackle?

A tackle used to haul the leeches of a sail up to the yard arms, when reefing.

What are relieving tackles?



Jigger.

Tackles hooked to the tiller, for the purpose of relieving the strain on the tiller ropes in heavy weather. In cases the tiller ropes carry away the relieving tackles would be used to steer the vessel. They have a double and single block.

What is a rudder tackle ?

A tackle hooked to the rudder chains or pendants. To steer the vessel in case of accident to the rudder head or helm.

What is a rolling tackle ?

A tackle hooked to the quarter of a yard, in order to relieve the strain on the truss or parrel, when the ship is rolling heavily.

What is a sail tackle ?

A purchase used to hoist a topsail to the yard, when bending. A small tail-block is bent to the lower block of the purchase, and it acts as a leader for the hauling part, to guy the sail clear of the top and yard when going aloft. Top burtons are generally used for sail tackles.

What is a side tackle ?

A purchase used to run out and train a broadside gun ; it consists of two double composition blocks.

What is an in-tackle ?

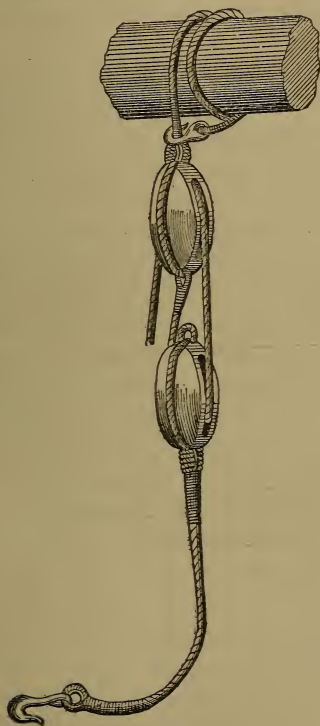
A tackle hooked to the rear of a gun carriage and to an eye bolt amidships in the deck ; used to run the gun in, and to prevent its running out while being loaded. (Formerly called train tackle.)

What is a stay tackle ?

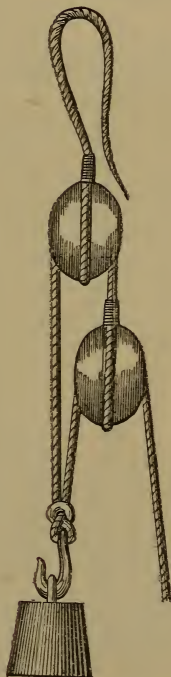
A heavy double purchase which is hooked to the "triatic-stay" when hoisting out boats ; applied also to any tackle hung from a stay when hoisting anything through the hatches.

What is a yard tackle ?

A heavy tackle hooked or made fast to the lower yard arm, used to hoist out boats and other heavy weights. The upper block is usually fitted with a strap to go around the yard.



Yard Tackle.



Single Spanish Burton.

What is a water whip?

A tackle used at the yard arms to hoist in stores, etc., etc.

What is a single Spanish burton?

It has two single blocks ; the hauling and standing parts of the fall come from the lower or movable block. The hook (which connects the burton with the weight to be moved) is fastened to the bight of the fall between the two blocks. It is used in the merchant service when handling cargo, etc.



*Double Spanish
Burton.*

What is a double Spanish burton?

It has one double and two single blocks. The standing part of the fall is made fast to one single block, then rove through the double block (which is fixed) ; the bight is then seized to the strap of the lower block (to which the weight to be lifted is hooked) ; the end of the fall is then rove up through the double block, down through the lower block, and then through the block the standing part is made fast to. With this arrangement the lifting power is five times greater than the power applied.

What is a stock-and-bill tackle?

A heavy tackle used in handling anchors at the bow.

What is a top burton?

A tackle used in the top ; it is kept hooked to the top pendants. The fall should be long enough for the lower block and end of the fall to reach the water, with end enough to haul on. It is a luff tackle, but instead of the double block, a fiddle block is used, on account of the narrow space between the rigging and the mast head.

What is a top tackle?

A heavy double purchase used in sending topmasts up and

down ; it is hooked into a thimble in the end of the top pendant (pendant tackles are used).

What is a watch tackle ?

A common luff purchase or jigger.

What are tricing lines ?

Single whips, or guntackle purchases used to trice up and lower down studding-sail booms and clothes-lines.

What is a winding tackle ?

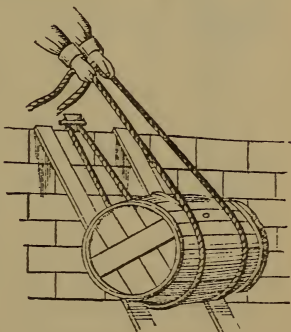
A purchase consisting of a double and single block or two single blocks ; it is used in hoisting heavy weights and hooks to the eye or thimble of the winding pendant.

What is a winding pendant ?

A pendant, one end of which secures around the topmast or lower masthead, or reeves through a block there, and secures on deck ; the other end reeves through the eye of a lizzard which is secured at the lower yard arm. The pendant is used to take the strain off the yard when hoisting heavy weights.

What is a parbuckle ?

The simplest kind of a purchase : the bight or middle of a rope is made fast, and the two ends are taken and passed *around and underneath* the object to be moved ; bring the ends back again ; then by hauling or slacking, the object can be hoisted or lowered.



Parbuckle.

What is a propeller purchase ?

A purchase that reeves through the sheaves in the saddle of the propellor, used to hoist and lower the propeller.

What is a runner and tackle ?

Simply a purchase of a double and a single block, hooked or attached to a runner.

What advantage has a tackle with patent blocks ?

The friction rollers, in the blocks, overcome a great amount of the friction. They cannot be used, however, with a great strain, for fear of crushing the rollers.

Which is the least affected by friction—manilla or hemp falls ?

Manilla.

How should the fall of a purchase lead ?

As clear or fair as possible, and the hauling part should be in a line, parallel to the rest of the purchase.

What is "racking" a purchase ?

Binding two parts of the fall together, with small stuff.

What is a "thorough-foot" in a fall ?

When a block gets capsized, and in consequence, the parts of the fall are crossed. A thorough-foot must be taken out before the fall is used.

What is "fleeting" a tackle ?

When a tackle gets two blocks, or block-and-block, the fall is overhauled and one block shifted forward or aft.

What is "swigging off" ?

Pulling at right angles on the bight of a rope, that is fast at both ends.

"Rope or Cordage."

How many varieties of rope used in the navy ?



Runner and Tackle.

Four varieties, hemp, manilla, hide, and wire. Hemp rope, is made of the fibres of the hemp plant ; manilla rope, is made from the fibres of a species of wild banana, called manilla ; hide rope, is made of strips of green hide ; and, wire rope, is made of iron and steel wire.

Where is the rope for the navy made ?

At the Government rope-walk, Boston Navy Yard.

Where is the best hemp raised ?

In Russia, Italy, and America.

Which do we use ?

The Russian and American—the Russian being used for the larger ropes.

What is the American hemp used for ?

Marline, houseline, hambroline, and all cordage spun by hand. This fibre is stronger than the Russian.

How is hemp rope protected ?

By being tarred.

What is untarred hemp called ?

White rope, or white line ; it is used for lead and log lines, etc.

What is manilla rope used for ?

Hawsers and running gear.

What advantage has the manilla over hemp ?

It is lighter, more pliable, and does not require tarring to protect it. In making it up, the fibres are sprinkled with whale oil.

Is it ever tarred ?

Yes. In making the larger hawsers, the outside yarns are sometimes tarred.

What is hide rope used for ?

Wheel ropes—one set of wire wheel ropes being also supplied vessels.

How is hide rope preserved?

By giving it a lick of a mixture of tar and tallow (one-fifth tallow to four-fifths tar), every six months. The rope should be perfectly dry when treated. Oil must never be used, nor should hide rope be soaked to make it pliable.

How is hide rope stowed below?

It is treated as before explained, and headed up in a beef barrel, to preserve it from the rats and mice.

What is wire rope used for?

Almost entirely for standing rigging. Vessels of the navy are now being furnished with *steel wire towlines*.

What is small stuff?

A term applied to small rope, and is specified by the number of threads or yarns it contains, as 15, 18, and 21 thread ratline-stuff, and 4, 6, 9, and 12 thread seizing-stuff.

What is spun yarn?

It is made of "*long tow*" of hemp, twisted up loosely, well tarred and rubbed, to keep it from opening. The threads are twisted *right handed* and laid up *left handed* to form the spun yarn.

How is it distinguished?

It is known as 2 and 3 yarn, spun yarn. It is very useful for rough seizings, etc., etc.

What is seizing-stuff?

Hambroline, houseline, marline, also 4, 6, 9, and 12 thread seizing-stuff.

What is hambroline?

A fine description of seizing-stuff.

What is roundline?

A fine *right handed* three-thread stuff (left handed yarns.)

What is meant by right and left handed yarns or rope?

Right handed, is when the twist or lay is from the right

to the left—left handed, when the twist or lay is from the left to the right.

What is houseline ?

A three-thread stuff, fine like roundline, but left handed ; it is used for service, seizings, etc., etc.

What is marline ?

Two thread stuff of finely dressed hemp ; it is left handed ; used for service, seizings, etc., etc.

What is ratline stuff ?

Small stuff, larger than seizing stuff ; from 12 to 24 thread.

How is small stuff measured ?

All, except ratline stuff, is measured by the pound.

How is ratline stuff, rope, etc., etc., measured ?

By the fathom.

What are nettles ?

They are made by laying up two or three yarns in a taut twist, with the thumb and forefingers, then rubbing them down smooth. Used for hammock clews and neat stops.

What are foxes ?

Made by laying up two or more yarns by hand, and rubbing down with tarred parcelling (canvas). They are used for temporary seizings, making mats, sennit gaskets, gripes, etc., etc.

What is a Spanish fox ?

A single yarn, twisted up in a direction contrary to its natural lay. Used for small seizings ; seldom used now.

What is junk ?

Pieces of condemned rigging, old rope, etc., etc.

What is oakum ?

Junk untwisted and picked to pieces ; used for caulking seams, etc., etc.

What are shakings ?

Odds and ends of yarns and small ropes ; found in the sweepings after work.

What is a rope yarn ?

Fibres, of hemp or manilla, drawn out of the bundle, overlapped, and twisted from right to left ; rope yarns are therefore right handed ; or it is one of the yarns forming a strand.

How much strain will a rope yarn bear ?

About one hundred pounds.

What is a strand ?

A combination of rope yarns, laid up or twisted left handed.



Plain Laid Rope.

What is a plain laid rope ?

Three strands laid up or twisted together, forming a right-handed rope.

What is a cable or hawser-laid rope ?



Hawser.

Three plain laid ropes are taken and laid up together, *left handed*, forming a left handed cable, or hawser of nine strands.

What is a four stranded or shroud laid rope ?

It is four strands laid up right handed, with a heart in the centre.

What is the heart ?

A small rope made soft and pliable. It is about



Shroud-laid Rope.

one-third the size of the strand. It keeps the ropes in proper shape.

What is a back-handed rope?

The strands are laid up with the same twist as the yarns (right handed). Then when brought together to form the rope they must be laid up left handed (or back handed). A back handed rope is more pliable and less liable to kinks, when new, than plain laid rope.

What is a tapered rope?

The part that bears the strain is full sized, tapering to the hauling part, which is light and pliable. This rope is used, when great strain is to come, only, on one end.

What is bolt rope?

Rope used for the roping of sails; it is made of the best hemp and finest yarns, and of less twist.

How is wire rope made up?

It has six strands to a rope, and eighteen wires to a strand. Each strand has a *hemp heart*, and the rope itself also has a hemp heart. These hearts make the rope more pliable. It is laid up right handed.

What are towlines?

Large *plain* laid ropes.

How do you measure the size of a rope?

By its circumference. Its length is measured by the fathom.

How does the cordage of men-of-war range?

From 1½ inch to as high as 19 inch hawsers, for very large vessels. The hawsers and towlines furnished a vessel vary, and depend upon the weight of her bower anchor.

How are hawsers and towlines stowed?

Upon reels, and should not be stored in the *hold*, if it can possibly be avoided.

What is the length of a hawser or towline?

One hundred and twenty fathoms.

What is the length of a new coil of rope?

From fifty to one hundred and fifty fathoms, varying with the size of the rope.

How should rope be coiled down?

Right handed rope, with the sun or from left to right; left handed rope, against the sun, except hemp hawsers; although left handed, they are coiled in tiers with the sun.

How would you take new rope from the coil?

The end is passed through the coil, and coiled down against its lay to get the turns out.

What is done with the running rigging on board ship (at anchor) during wet or very foggy weather?

It is slacked up.

Why?

The rope contracts or shrinks when wet, and the rigging should be slacked, in order to avoid springing a yard or carrying something away.

How is standing rigging protected from the weather?

If of hemp, it should be covered with a coating of blacking, made of tar oil and coal tar. Wire rigging is galvanized, but it is wormed, parcelled, served, and blacked from end to end, as a protection against wear and tear. If ever used when not galvanized, it is protected by a mixture of red lead and boiled linseed oil.

What is done before stowing ropes or hawsers below?

They are all thoroughly dried, to prevent rot and mildew.

How is one rope rove off by another?

Place the two extreme ends of the ropes together, and worm three yarns of spun yarn in the lay of the ropes for four or five inches on either side, called, "marrying the ropes together;" haul on the old rope and reeve the new one in its place. New braces, etc., etc., are generally rove off in this way.

What is the standing part, the hauling part, and the bight of a rope?

The standing part, is the end made fast. The hauling part, is the end taken hold of to haul on. The bight, is the part between the standing and hauling part.

CHAPTER VIII.

THE COMPASS, HELM, LEAD, LOG, AND LOOKOUTS.

What is a compass?

The instrument, by which the ship's track or the course upon which she is sailing, is pointed out.

What compass is used in the navy?

Ritchie's liquid compass.

What are the principal parts of a compass?

The card, the needle or magnet, and the bowl.

How does the needle or magnet point?

Always North.

What form is the card?

A skeleton card, of circular form.

Into how many points is the compass card divided?

Thirty-two, and each point is sub-divided into halves, quarters, and eighths. The card is also divided into degrees.

How many degrees in a point?

Eleven degrees and fifteen minutes. There being 360 degrees in every circle, and the compass circle being divided into thirty-two equal parts, it gives us eleven degrees and one quarter to each part or point.

What are the cardinal points?

North, East, South, and West; they are represented by the letters N.—E.—S.—W., respectively. Different combinations of these letters, will represent the intermediate points of the compass.

How many points between each of the cardinal points?

Seven points.

What are the half-cardinal points?

N. E.—S. E.—N. W.—S. W., called *north-east, south-east, north-west, and south-west*. These points are half way between the respective cardinal points, or four points from each.

What is the "lubber's point"?

The black vertical line on the inside of the bowl of the compass. It represents the vessel's head (when steering).

The following description of the Ritchie compass is an extract from a paper on the Marine Compass, by Lieut. R. P. Rodgers, U. S. Navy:

THE U. S. NAVY COMPASS.

The Navy Compass designed and constructed by E. S. Ritchie & Sons, of Boston, has the distinctive peculiarity of a buoyant card in a liquid-resisting medium, the mean density of the card being so adjusted to the density of the liquid as to produce a small downward pressure upon the pivot in the ordinary form of compass or a small upward pressure in those compasses of the class known as the cabin "tell-tale."

The compass-bowl (see Figs. 13 to 19) is made of cast bronze; the glass cover is closely packed with rubber, completely preventing the evaporation or leakage of the liquid, which entirely fills the bowl. Beneath the bowl is a metallic self-adjusting expansion-chamber of elastic metal, by means of which the bowl is kept constantly full without the show of bubbles or the development of undue pressure caused by the changes of volume of the liquid due to changes of temperature. The bowl-circle, or outer

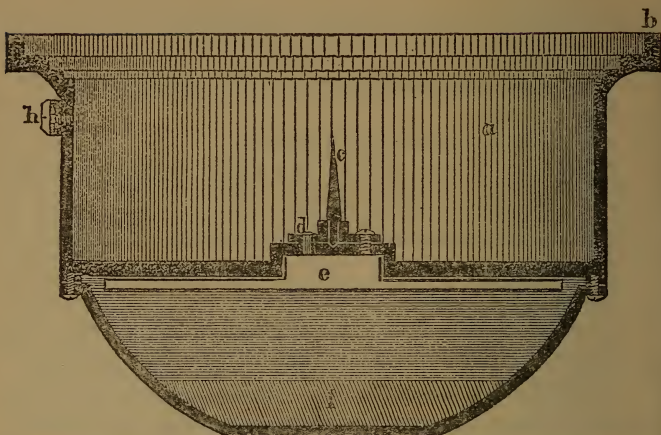


FIG. 13.

a-Compass bowl.

b-Rim of bowl.

c-Pivot.

d-Hole connecting bowl
with expansion cham

ber.

e-Expansion chamber.

f-False bottom of bowl
with lead at bottom to give

stability to bowl.

g-Glass cover.

h-Side filling hole.

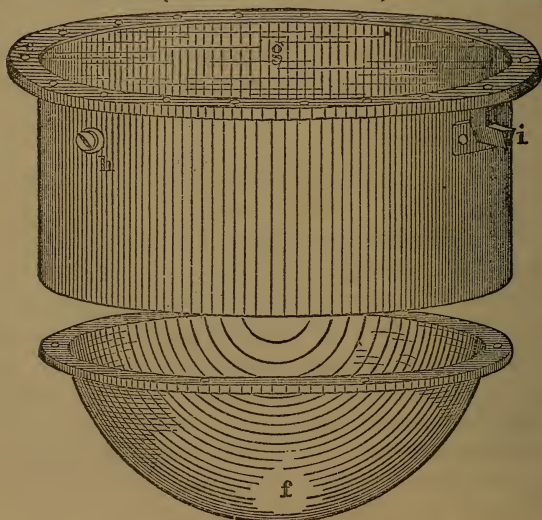
i-Knife edges supports upon
which bowl rests in gimbals.

FIG. 14.

Section through XX

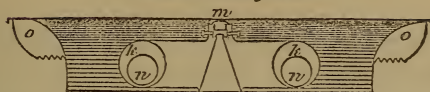


FIG. 15.

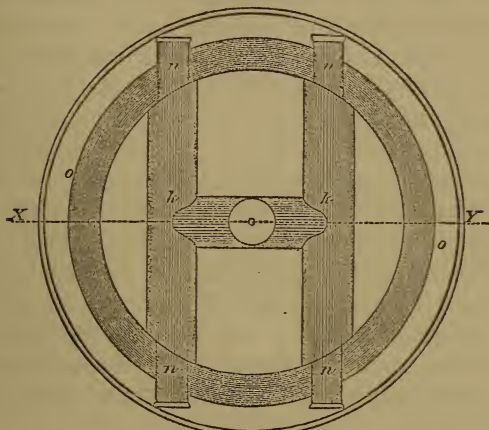


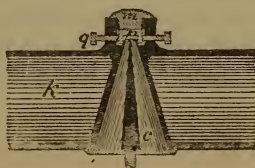
FIG. 16.

Boltoms of Card.

h Buoyant cylinders in which caps resting on pivot.
o are placed the magnets. *n* Magnets soldered in cylinder
o Buoyant ring of card.



Top of card.



edge of the rim of the bowl, is made rigid and turned strictly to gauge, so as to admit of the interchange, from one bowl to another, of every azimuth-circle of its class. (The ship compasses now furnished to the service are of one size.) The lubber's line is a fine line drawn on an enameled plate placed on the inside of the bowl, whose inner surface is covered with a white paint which is insoluble in the liquid.

(Directions for preparing the fluid and filling the bowl.)

—The liquid used is 34 per cent. pure alcohol, and 66 per cent. distilled water, and remains liquid at— 10° Fahr.

In filling the bowl, place the card on its pivot and pour in the liquid until nearly full. Then by placing the compass under the receiver of the air-pump any air which may remain in the liquid is removed. This prevents the formation of small bubbles, which without this precaution, would frequently appear. The glass plate is then put on, the rubber strap placed around it, and the top ring screwed down. (This ring, when screwed down, presses on the rubber, forcing it against the edge, but not on the faces of the glass, and thus prevents the breaking of the latter.) After this the bowl is turned on its side and more liquid is poured in through the side screw-hole, which should now be uppermost. The bowl is then shaken so that the air under the glass may escape. This being done, and care being taken that the expansion chamber is but partially full (half full, at a temperature of 60°), finally, with the screw just inserted in its hole, with a gentle pressure upon the expansion-chamber force the air out and tighten the screw.

The Navy Compass in general use has a 7.6-inch skeleton card, with provision for one pair of magnets symmetrically placed, as hereafter described. The outer inclined ring,

convex on the upper and inner side, is graduated to read to one-eighth point, and a card-circle is adjusted to the ring, which is divided to half degrees, with legible figures at each 5° , for use in reading bearings by the azimuth-circle or in laying the course to degrees. The ring forms the upper portion of an annular chamber, which, with the cylinders containing the magnet and central cap, are air-tight, and have sufficient capacity to support, by their buoyancy in the liquid, the entire weight of the card (including magnets) to within sixty grains when the liquid is at 60° Fahr., or to within eighteen grains at a temperature of 13° . The middle point of each of the cylinders containing the magnets is joined by another air-tight cylinder, at the middle of which is found the central cap, which rests upon the pivot, and so supports the card. This cap may be accurately adjusted by small screws acting upon it. The pivot is fastened to the center of the bottom of the bowl by a flanged plate and two screws. Through this plate and the bottom of the bowl are two small holes, which communicate with the expansion-chamber, and admit of a circulation of the liquid between it and the bowl. The point of the pivot is of bell-metal and very sharp. At the center of the cap is a small ruby cup, which rests upon the pivot when in place.

The weight of the card complete, in air, is 5,350 grains, of which 1,350 grains is in the steel of the magnets.

The magnet system of the card consists of two equal compound magnets inclosed in the parallel cylinders placed in the chords of the circle a little within the arc of 30° from the parallel diameter. Until of very recent date each magnet was built up of six laminæ, each lamina being $6\frac{1}{2}$ inches long, $\frac{7}{8}$ inch wide, and about $\frac{1}{40}$ inch thick. The steel of which the magnets were made, is that known as

“Stubb’s Sheet,” which, from numerous experiments by Mr. Ritchie, was found to be the best for this purpose, not only for its uniform excellence, but for its magnetic capacity in both intensity and permanence. The laminæ having been cut to the proper size, were hardened and tempered throughout their entire length, the process being so conducted as to secure a remarkable degree of uniformity in the results. The magnetization to their utmost capacity was effected by means of a very powerful electro-magnet. After this the laminæ were separately tested for their relative magnet-power by a deflection-needle, and the angle of deflection marked on each. They were then laid aside for a little time in promiscuous contact. As required in the formation of card-magnets, these laminæ were again carefully examined for magnet-power, and every piece which showed diminution of power was thrown out. Magnets of the latest pattern, furnished by Mr. Ritchie, are made of steel wire about .06 inch in diameter, formed into cylindrical bundles and soldered into the cylinders. They are magnetized between the poles of a powerful electro-magnet instantly and to saturation after the card is finished. The change to wire was made because it can be more perfectly tempered and for the same weight gives greater power.

“Box the Compass:”

North.

North by East.

North North-East.

North-East by North.

North-East.

North-East by East.

East North-East.

East by North
 East.
 East by South.
 East South-East.
 South-East by East.
 South-East.
 South-East by South.
 South South-East.
 South by East.
 South.
 South by West.
 South South-West.
 South-West by South.
 South-West.
 South-West by West.
 West South-West.
 West by South.
 West.
 West by North.
 West North-West.
 North-West by West.
 North West.
 North-West by North.
 North North-West.
 North by West.
 North.

North.
 North $\frac{1}{2}$ East.
 North by East.
 North by East $\frac{1}{2}$ East.
 North North-East.

July 26, 1904.
 39 C St N.E.,
 Washington
 D.C.

A mi querido amigo
 al Señor Juan
 Catelino Libentius
 expuesta de maestro
 de escuela
 de Leque Island,

Box by Half Points:

Phila. R.

North North-East $\frac{1}{2}$ East.

North-East by North.

North-East $\frac{1}{2}$ North.

North-East, etc., etc.

Box by quarter points :

North.

North $\frac{1}{4}$ East.

North $\frac{1}{2}$ East.

North $\frac{3}{4}$ East.

North by East, etc., etc.

Commence at North-East and box to the Southward ; at North North-West and box to the Westward, etc., etc.

What is the opposite point to N. W. ?

South-East. Bear in mind that the letter "N" is opposite to "S" on the compass card, and the letter "W" is opposite to "E", (or North opposite South and West opposite East.) By remembering this you can readily answer the opposite points; for example, S. S. E. is opposite N. N. W., and S. W. by S. is opposite N. E. by N., and E. $\frac{1}{2}$ S. is opposite W. $\frac{1}{2}$ N., etc., etc.

If a ship heads directly North, where do the cardinal points mark ?

North will mark "right ahead" or "dead ahead." South will mark "right astern." East will mark "right abeam," (starboard side), and West will mark "right abeam" (port side.)

A ship heading directly North, where do the "half cardinal points" mark ?

N. E., the starboard bow ; S. E., the starboard quarter ; N. W., the port bow, and S. W., the port quarter.

Then how many points from the ship's head (or right ahead) to the bow or "broad on the bow" ?

Four points.

How many points from the ship's head to "right abeam"?

Eight points.

How many points from the ship's head to the quarter (or broad off the quarter)?

Twelve points.

How many points from the ship's head to right astern?

Sixteen points, or half the points of the compass.

What is the standard compass?

The compass by which all bearings, etc., are made. It is raised above the deck, in that part of the ship where local influences, (such as iron or steel) affect it least.

What is a binnacle?

A wooden, or composition case to hold a compass, and is usually mounted on a stand. It has a glass top, covered with movable brass plates. Lamps are attached, at the side of the top, to light the card at night. The steering, or binnacle compass, is placed inside the binnacle. Men-of-war have two binnacles, one on each side of, and forward of the wheel.

What is the tell-tale compass?

A particular form of the Ritchie's compass, so arranged, as to be suspended from the deck beams above, in order that its card may be seen from below. It is generally placed in the cabin, where it can be referred to by the commanding officer.

What is a boat compass?

A small compass fitted in a brass case (this case is painted black), that has a small lamp attached. They are used in boats, whenever needed.

When looking at a compass on deck, and the ship's head changes direction, it will appear as though the compass *card*

was revolving. This is *not* the case, it is *the ship that revolves.* The magnetic needle attached to the card *always* points to the north, and therefore keeps the card pointing in that direction. The lubber's point represents the ship's head, and by careful attention it will be seen that it is the *lubber's point* (or ship's head) *that is moving away* from a given point on the card, and *not the point* itself moving *from* the lubber's point.

THE HELM.

What is the helm?

The apparatus, by which a vessel is steered. It is composed of the rudder, tiller, tiller-ropes, (or wheel ropes) and wheel.

Describe the rudder?

It is a long, peculiar-shaped timber or piece of iron, which is attached to the stern-post, or rudder post of a vessel, by means of pintles (or bolts) on the forward side of the rudder, which ship into gudgeons, (bolts or braces with an eye in them) that are secured to the after side of a rudder-post of a vessel. Rudders for ship's boats are of similar shape, and made of wood or metal.

What is the rudder-head?

The top or upper part of the rudder.

What is a jury rudder?

A rudder made of spare spars, planks, etc., etc., to replace one that has become unserviceable. A hawser is sometimes used; it is towed, with a long scope, astern, and has tackles made fast to it, leading to each quarter, to work it.

Describe the tiller?

It is an iron or wooden bar, which fits into the socket in the rudder head, forming the lever for moving the

rudder. On screw steamers the rudder-head is generally shaped to receive an iron yoke or quadrant, which ships on the rudder-head with the arc aft; the tiller ropes reeve through separate slots in the quadrant, and shackle to the extreme ends of the arc.



What is the tiller-head?

That part of the tiller which is farthest from the rudder, when the tiller is shipped

Quadrant.

in its socket.

What are tiller or wheel ropes?

Ropes that connect the tiller with the wheel.

What is a spare tiller?

An extra tiller, provided ships, in case of accident to the one in use.

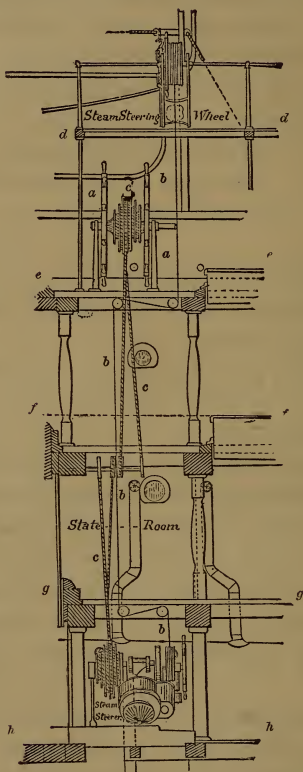
Describe the wheel?

It is a double, circular frame, shaped like a wheel, the two parts, one abaft the other, being connected by a barrel on which the wheel ropes wind; the spokes of the wheel project out, in order to give handles to turn it by. The wheel on men-of-war, is usually placed aft, just forward of the mizzen mast. Vessels are now being rigged with steam steering apparatus, particularly vessels of great length.

How are wheel ropes rove on men-of-war?

Through blocks, hooked or shackled to the tiller head, and blocks hooked to the ship's side, in the after part of the wardroom, then through casings under the beams to sheaves in the deck under the wheel, and make fast to the barrel of the wheel. With quadrants, the wheel ropes cross; that is, the port wheel rope makes fast to the starboard arm of the arc (of the quadrant) the starboard,

STEAM STEERING GEAR U. S. S. "LANCASTER."



a.—Spar-deck wheel. *b. b. b.*—Connect steam steerer with steam steering-wheel. *c. c.*—Wheel ropes. *d. d.*—Bridge. *e. e.*—Spar deck. *f. f.*—Gun deck. *g. g.*—Berth deck. *h. h.*—Orlop deck.

wheel rope to the port arm, both reeving through their respective slots, and crossing before reaching the barrel of the wheel.

What is understood by the "ship's course" when given to the man at the wheel?

It is the point of the compass the ship's head is to be kept at, for a certain period.

What is steering a vessel or boat?

Moving her head in any particular direction, or keeping her on any given course. This is accomplished by moving the tiller, and placing the broad surface of the rudder in such a position, that the water will act upon it, and force the vessel's stern one way and her head the other.

In steering, what direction does the wheel go when compared to the ship's head?

The same direction.

When the order is given "STARBOARD!" how is the wheel moved?

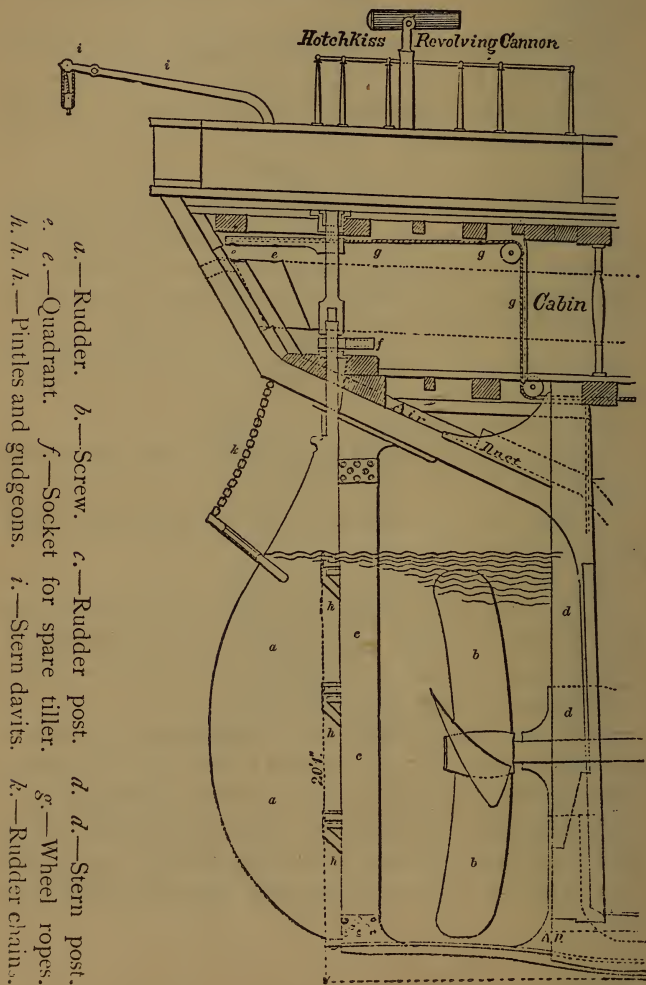
To port; for with starboard helm the ship's head moves to port.

Why?

Moving the wheel to port, will wind the starboard tiller rope on the barrel and move the tiller over to starboard, which places the rudder in such a position, in the water, that the vessel's head is forced to port.

From the above it will be seen that the order STARBOARD! or PORT! refers to the tiller and not to the wheel; therefore, when the order is given to put the helm to starboard, or to port, remember that the tiller is to go to starboard, or port, as the case may be, and to accomplish this, the wheel must be moved over in the same direction the ship's head is to go.

SECTION OF U. S. S. LANCASTER, SHOWING RUDDER, SCREW, ETC., ETC.





What is meant by helm amid-ships?

Putting the tiller in line with the keel—or *directly* fore-and-aft.

How do you know when the helm is amid-ships?

By the mid-ship spoke, which should be *up*, and *perpendicular* to the line of the keel. This spoke is larger than the others and is different in form, so it can be easily distinguished at night. The turns of the wheel ropes on the barrel, is another method of telling the way the helm is carried. When the helm is amid-ships the same number of turns are on the forward and after part, of the barrel, of the wheel.

What part of the barrel does the starboard wheel rope wind on?

The forward part. The port one on the after part.

How can you tell when the helm is to starboard, or to port?

If the helm is starboard, the turns of the wheel rope will accumulate (or wind) on the forward part of the barrel of the wheel, and decrease or unwind on the after part. If the helm is to *port* the turns on the barrel will be just the opposite.

What is meant by "two turns starboard helm?"

The tiller is well to starboard, and about two *extra* turns of the tiller rope have been wound on the forward part of the barrel. "*Two turns to port*" would be just the opposite.

Which side of a vessel is the weather side? The lee side?

The weather side, is the side *towards* the wind, or on which the wind *first strikes*; the lee side, is the opposite side to the weather side. Sheets of fore-and-aft sails are hauled aft, on the lee side.

What is meant by "the weather wheel?" "The lee wheel?"

The *weather* and *lee side* of the wheel. For example, "Whose weather wheel is it?" "Whose lee wheel is it?" applied to the men, whose turn it is, to take the weather or lee wheel.

What is "conning a ship?"

The act of giving various orders, directing the helmsman to steer the ship on her proper course.

What is a man's time at the wheel called?

His "*trick*" at the wheel.

What is meant by "helm up," or "helm down?"

The helm is *up* when the tiller is over to the weather side, or up *against* the wind. The helm is down when the tiller is over to the *lee* side, or down *from* the wind.

What is meant by hard-a-starboard, hard-a-port?

Moving the wheel, so that the tiller will go over as far as possible to the starboard side; hard-a-port, is the opposite to this.

What is meant by "steady?"

The ship's head is pointing in the right direction, and to keep it so.

What is steady-a-port? Steady-a-starboard?

It means the ship's head is pointing *about* right, but to put her helm a little to port, to keep her head from turning to port. Steady-a-starboard, is the opposite.

What is understood by "meet her?"

When the ship's head moves to starboard, or port, in obedience to the helm, as she nears the proper course, the helm is *gradually* put the opposite way to "*meet her*" (or check her), so she will not pass the desired point.

When is a vessel "on the wind," "by the wind," "on a bowline," or "close hauled?"

When the yards are braced sharp up on either tack, tacks

well down, sheets aft, bowlines hauled out, and the ship sailing as close to the wind as possible.

When is a vessel on the starboard tack? Port tack?

When the wind is blowing on her starboard side, her starboard tacks are aboard (starboard clews of her courses hauled forward,) and her port sheets aft (port clews of her courses hauled aft.) The *port* tack is the opposite.

When are yards braced sharp up?

When the lee braces are hauled in, and the *weather* yard arms carried as far forward, as the rigging will permit.

When are yards braced in?

When the *weather* braces are hauled on, and the lee braces eased off, and the yards clear of the rigging.

What is meant by "no higher?"

The ship is too close to the wind, and the helmsman is to "let her go off" a little.

What is meant by "let her go off?"

Put the helm up a little, to allow the ship to go off from the wind.

What is meant by "nothing off?"

The ship is not close to the wind, and the helmsman is to "let her come up" a little.

What is meant by "luff her?"

The helmsman is to put the helm down, and bring the ship up into the wind.

What is meant by "right the helm?"

To put the helm amidships.

What is meant by "shift the helm?"

When the tiller is well over to one side, to shift it, or bear it over to the same position on the other side.

What is meant by "ease the helm?"

To allow the tiller to move more amidships, and ease the strain on the tiller ropes and rudder.

What is "weather helm?" "Lee helm?"

Weather helm, is when the tiller is carried over to the weather side. Lee helm, when the tiller is carried over to the lee side.

What is meant by "mind your weather helm?"

A caution given to the helmsman, to meet the ship should she fly into the wind. Usually given, when some head sail is about to be taken in.

How can weather and lee helm be relieved?

Weather helm can be relieved by reducing (or taking in) after sail, or increasing (setting) head sail. Lee helm can be relieved by reducing head sail, or increasing after sail. Also regulated by trimming the yards.

How should a vessel carry her helm?

As near amidships as possible, so the rudder will not drag and reduce the speed. Vessels on the wind, generally take a spoke or two of weather helm, to tauten the wheel ropes.

When is a vessel "full and by?"

When she is close hauled, and making as much to windward, as possible, with the sails full.

What is a vessel steered by when "full and by?"

In good weather, by the weather leech of the main royal, or any upper sail on the main. In heavy weather, by the weather leech of the mainsail. The weather leeches should be kept "touching" or quivering with the wind.

What is meant by "very well thus," or very well dice?

The ship is sailing a good "full and by;" keep her so.

What is bearing up?

Putting the helm up and running away from the wind, to leeward.

How close to the wind will a good (square rigged) working vessel lie?

About six points.

How close to the wind will a fore-and-aft rigged vessel lie?

About four points.

What are the usual methods of working a ship to windward?

By tacking or wearing.

What is tacking?

When a ship is close hauled on one tack, by putting the helm down, and letting go the head sheets, she is brought up head to wind; then by working the yards and sails, she is made to fall off on the other tack.

If a ship lies within six points of the wind, how many points will she tack in?

In twelve points.

What is wearing?

Getting a ship on the other tack, by putting the helm up, and running off from the wind, bringing the wind aft; and finally, with the helm, and by bracing the yards, the wind is brought on the other bow.

How many points will a ship wear in?

Twenty points.

Which is the best method of working to windward?

Tacking.

Why?

Because if properly preformed, a ship will lose nothing to leeward; on the contrary, she will "*head reach*," and gain, that is, run up several of her lengths to windward, while in stays (going about or tacking).

What is leeway?

The drift a vessel makes, away from the wind, when close hauled.

What is meant by "a good full for stays?"

The helmsman is to keep the sails full, and get good headway (or speed) on the vessel before tacking.

How is the helm put down when tacking?

It should be eased down, slowly and gradually, so as not to deaden the ship's headway.

When a ship fails to tack what is it called?

Missing stays.

When is a ship "in irons?"

When "in tacking" she stops dead in the water, and will not fall off either way.

When tacking, if headway is lost (ship stops), what is done with the helm?

It is put amidships.

After stopping, suppose the vessel "gathers sternboard" (starts going astern)?

Shift the helm for sternboard.

How is a helm put for sternboard?

The *wheel* is turned the *opposite* way the ship's head is to go, the tiller going the *same way* the ship's head is to go. That is, the helm is put just the opposite to the way it would be if the ship was moving ahead, instead of moving astern.

What is weathering a place or point?

Sailing, or passing to windward of it.

What is running to leeward of a place or point?

Sailing, or passing on the lee side of it.

When is a ship sailing free?

When she is sailing with the yards braced in, and the sheets eased off.

LOOKOUTS.

Where are lookouts stationed, during the day, while at sea?

From daylight to sunset a man called "mast-head lookout," is stationed on the slings of the foretopsail yard, and

sometimes one, in addition, on the maintopsail yard. He is required to report all sails, land, or strange objects that may come in sight. He is not only to keep a *bright lookout* ahead, but also around the horizon, and he must be careful to let nothing escape his eye.

How is a sail or land reported?

By singing out: Sail Ho!! Land Ho!! The answer from deck is WHERE AWAY?

How are the lookouts stationed, for the night, at sea?

One at each cat-head, one in each gangway, and one on each quarter. Sometimes at sea, when carrying studding sails, quarter watches are stationed in the fore and main tops. The lookouts on deck are called the "*deck lookouts*," and are required to keep a bright lookout, and report sails or lights, etc. They are to pass the hail every half hour, that is, sing out the name of their station or lookout, as "*starboard cat-head*," "*port gangway*," "*starboard quarter*," etc., etc. On board some vessels, the cat-head lookouts are required to report the condition of the side lights, in addition, as "*starboard cat-head bright light*."

What are the lookouts in port?

The quartermaster and sentries. The quartermaster reports to the officer of the deck, all boats approaching the ship before sundown, and hails and reports, all boats approaching the ship after sundown. He will also report anything unusual that may occur around the harbor. Signalmen, are also kept on the lookout for signals.

How is a boat hailed at night, and what are the answers?

The boat is hailed by singing out: "BOAT AHOY!" The answers are: for all enlisted men "HULLO!" for warrant officers "No! No!" for all commissioned officers below commanding officer "AYE! AYE!" for all commanding of-

ficers, the name of the vessel they command, as "PORTSMOUTH!" "SARATOGA!" etc., etc.; for all flag officers the answer is "FLAG!"

How can you tell when a commanding officer is temporarily out of his vessel, at night?

A white light is hoisted at the peak, (or end of the spanker gaff.)

How can you tell when a flag officer is temporarily out of the ship, at night?

For a commodore, two lights are hoisted at the peak; for an admiral, vice-admiral, or rear-admiral, three lights are hoisted.

Flag-ships carry a white top-light, in the mizzen-top.

LEADS AND LEAD LINES.

What is a lead line?

A line with a leaden weight attached, used to find the depth of the water.

What is finding the depth of water called?

Sounding.

How many kinds of leads and lead lines are there, in general use?

Three, the hand-lead and line, the coasting-lead and line, and the deep-sea lead and line.

When is the hand-lead used?

On entering or leaving port; or in any case when cruising, it is expected to find less than 20 fathoms of water.

What is a fathom?

Six feet.

How much do the hand leads weigh, and what is the usual length of the line?

They weigh from seven to fourteen pounds; the line is from twenty to thirty fathoms long.

When is the deep-sea lead used ?

In a greater depth of water than twenty fathoms.

What are the weights of the deep-sea lead, and the length of the line ?

They weigh from forty, to one hundred pounds ; the line is from eighty, to one hundred and fifty fathoms in length.

When are the heaviest leads used ?

In very deep water.

How do you know, by the hand lead, the depth of water you are in ?

The hand-line is divided into twenty equal parts, or fathoms, called marks and deeps, commencing at the bottom or lead end ; and, if in very shallow water, the line is divided into feet, marked by white or red rags.

How many marks, and how many deeps ?

Nine marks and eleven deeps.

What are the marks and how distinguished ?

At 2 fathoms, 2 strips of leather.

At 3 fathoms, 3 strips of leather.

At 5 fathoms, white rag.

At 7 fathoms, red rag.

At 10 fathoms, a piece of leather with a hole in it.

At 13 fathoms, three strips of leather.

At 15 fathoms, same as 5, white rag.

At 17 fathoms, same as 7, red rag.

At 20 fathoms, piece of line with 2 knots.

What are the deeps ?

They are at 1, 4, 6, 8, 9, 11, 12, 14, 16, 18, and 19 fathoms. They have no marks to distinguish them, but are distances between the different “marks,” and must be guessed at, calculating the deep from the mark nearest it.

How is the deep-sea line marked ?

By knots at every five fathoms, commencing at twenty fathoms.

At 20 fathoms, 2 knots.

At 25 fathoms, 1 knot.

At 30 fathoms, 3 knots.

At 35 fathoms, 1 knot, etc., etc.

There is an additional knot, for every tenth fathom after twenty. For example, thirty, 3 knots; sixty, 6 knots. The midway mark of 5 fathoms between these knots is always one knot, as 45 fathoms, 1 knot, etc., etc.

What is there peculiar in shape about the deep-sea lead, that is different from the hand lead?

It is hollowed out at the base, and before taking a sounding, this hollow is "armed" (filled with tallow), so that when the lead strikes bottom, any small substance, as shell, sand, gravel, etc., etc., will stick to the tallow, and in that way, the nature of the bottom can be told. Should the lead strike rocks, the tallow would be dented or cut out.

How is the line bent to the lead?

A long eye splice is made in the end of the line. Through the hole in the top of the lead a becket is worked, which is covered with leather. Pass the eye in the end of the line, through the becket, down over the bottom of the lead, and haul it taut up to the becket. (See fig.)

Where is the hand lead hove from?

Deep-sea lead.

From the main chains, or from an after boat, so placed, that the lead will swing clear of the ship, while being hove.

What is done on going into the chains or boat to heave the lead?



See the ends of the breast band well secured to support the body; the apron, if any, adjusted in front, to protect the clothing from water. The line clear, and the inner end (or end from the lead) made fast. The toggle is placed at a convenient distance from the lead, to take hold of when heaving.

How is the hand lead hove ?

It is thrown as far forward as possible, and the soundings taken when the lead comes aft, opposite the leadsman, and the line is taut up and down. The leadsman will know by the "feel" of the line, whether the lead is on the bottom or not.

Describe heaving the lead ?

Grasp the line at the toggle, swing it backwards and forwards and once or twice over the head, (bending the arm slightly when the lead is over the head, and straightening it when the lead is near the water). When the lead is swinging with sufficient force, let go the toggle with a jerk, at the last of the swing, or just as the lead comes forward of the feet of the leadsman, *before it rises*. Try and heave it so that the lead, as it shoots forward, will not rise above the centre of the leadsman's body. An apprentice can become an expert leadsman only by constant practice, not only in heaving, but in measuring with the eye the different deeps, etc., on the line.

If a dark night, how would you tell the soundings ?

Take the distance, with the line, from the breast band to the water's edge, and at each cast, deduct this distance from the amount of line out.

Having learned the marks and deeps, how would you call the soundings ?

The "marks" are called "*by the mark*," the "*deeps*,"

"*by the deep.*" For example: "*by the mark*" "7," "*by the deep*" "8." Each sounding should be sung out sharp and distinct, not drawled out.

How are the $\frac{1}{4}$ fathoms, $\frac{1}{2}$ fathoms, and $\frac{3}{4}$ fathoms distinguished and called?

They are measured with the eye (guessed at) from the nearest mark or deep. The $\frac{1}{4}$ fathoms are called "*and a quarter,*" the $\frac{1}{2}$ fathoms "*and a half,*" the $\frac{3}{4}$ fathoms "*and a quarter less.*" For example: $6\frac{1}{4}$ fathoms "*and a quarter six,*" $6\frac{1}{2}$ fathoms "*and a half six,*" $6\frac{3}{4}$ fathoms "*and a quarter less seven,*" etc., etc.

How are the soundings taken with the deep-sea lead?

Sufficient men are ranged outside on the *weather side*, and the end of the deep-sea line (which is kept on a reel aft) is passed from well aft on the weather quarter, as far forward as is necessary, being careful to keep the line clear of everything. (The quantity of line to be taken off the reel and passed forward will depend upon the supposed depth of the water.) The deep-sea lead having been well "*armed*" and sent forward, is bent on there to the end of the line. The line, aft and inboard, is kept clear for running, the reel being held by two of the afterguards. Should the line accumulate outside, each man, commencing at the forward one, is to gather a small coil in his hand, being careful, however, to let it go in time, and not check it, as it passes him, unless the lead has reached the bottom. When "*ALL READY FORWARD!*" is reported, the ship is "*hove to*" or thrown into the wind and her headway deadened. At the order "*HEAVE!*" the lead is hove overboard from the cat-head, fore chains, or wherever it may be, by the person holding it (generally the captain of the fore-castle), who sings out "*WATCH! HO WATCH!*" and as the line runs out each man throws his coil

clear and sings out "WATCH! HO WATCH!" (remembering the caution to let it go in time.) The sounding is taken by the "quartermaster" aft. The line is then snatched to a small block secured to the mizzen rigging, weather vang, or some convenient place. And at the order the men lay aft and run the line in, walking in carefully as the lead approaches the ship, when the lead is detached, the line is reeled up. The lead is examined to see what bottom, if any, is brought up by the "*arming*."

With a ship "lying to" in a gale, how is the deep-sea line passed for sounding?

The end is passed from to windward, around the stern, forward on the lee side, where the lead is hove from.

What is a "coasting lead?"

The name given to a lead used in running along a coast, when you have more than 20 fathoms, and less than 75 or 80 fathoms of water.

What other methods are there for finding the depth of the water?

Several patent sounding apparatus, the most successful of which is Sir William Thomson's.

What is a drift lead?

A lead used when lying at anchor, blowing fresh, or in foggy weather. The lead rests on the bottom and the line is made fast on deck, with a man stationed there to tend it, who must look out for the change of tide, etc., etc. Should the vessel drag or part her cable, the drift lead, if on the bottom, and properly "tended," will give instant notice of it, for the line will immediately slant forward as the ship goes astern.

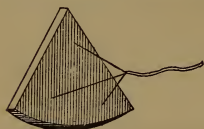
“ THE LOG.”

What is the log?

The apparatus, used for obtaining the velocity, or speed of a vessel through the water.

What does the log consist of?

The log line and reel, log chip, the long-time glass of 28 seconds, and the short-time glass of 14 seconds.



What is the log chip?

A flat piece of thin board, in the form or shape of the quarter of a circle, loaded on the circular edge with sufficient lead, to make it float vertically (or up and down) in the water. At the three corners small holes are bored. Through two of the holes (those near the leaded edge) the ends of a piece of small line (about 4 feet long) are rove. A knot is then put in these ends to prevent their pulling out. A wooden plug is fastened to the middle part of this line. The third hole is for the log line.

What is the log line?

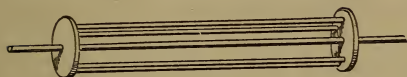
Small “white line” about 150 fathoms long, divided into distances called knots, which are sub-divided into tenths of knots. The outer end of the log line is rove through a hole in the upper corner of the “log chip,” and a knot made in the end to prevent it coming out. A small wooden socket for the plug to fit in, is made fast to the log line, at a distance from the “chip,” to correspond with the distance of the plug from the “chip.”

What is the plug and socket for?

Before heaving the log, the plug is fitted close in the socket, and then the chip is hanging by a three legged span (see fig.) Now when the log line is straightened out and trailing in the water astern of a vessel, the broad surface of the chip will be perpendicular to the line.

What is the log-reel?

A wooden frame, about two feet long, revolving on an iron spindle, having



wooden handles at each end. The inner end of the log

Log Reel.

line is made fast to this frame, and the line then reeled up.

What is the length of a knot in feet?

About 47.3 feet, or 47 feet and 4 inches. It is the same part of a sea mile that 28 seconds (the long glass) is of an hour.

What is the length of a sea mile?

It is 6086.4 feet.

A quick way to roughly calculate the length of a knot, is to add a cipher to the number of seconds in the given glass, and divide by six—the result will be the length in feet nearly: for example, with the 28-second glass we have with a cipher added 280, which divided by 6 will give 47 feet nearly.

How is a log line marked?

Soak a line in water, a few days, to get the kinks out, and at about 15 or 20 fathoms from the chip, mark the stray line. This is marked by a piece of red bunting, about six inches long. From the stray line measure 47 feet 4 inches for the first knot, which is marked by a piece of fish line with one knot in it. The remaining knots at intervals of 47 feet 4 inches, are marked by fish line with two, three, and four knots, etc., etc., according to its number from the "stray-line" mark. Each space between the marks is to be sub-divided into five equal parts, and the five parts are each marked by a piece of *white bunting*, about two inches long. This white bunting will, therefore, mark every two-tenths of a knot.

What is the "stray line?"

The allowance made, to permit the chip to float well clear of the eddies, etc., astern of the vessel, before marking the knots.

What are the time glasses?

The 28 second or long glass; the 14 second or short glass. They consist of two glass chambers called bulbs, joined by a small neck (hour glass shape).



One of the bulbs, in each glass, has an opening, through which is poured a quantity of clean, dry sand. The quantity of sand placed in each glass, should be such that it will take exactly 28 seconds of time for the larger, and 14 seconds of time for the smaller, to have the sand pass from the upper

Time Glass. bulb, through the neck, into the lower bulb, when the glass is held in a vertical position.

How do you heave the log?

Two of the afterguards hold the reel, one holds the time glass. The quartermaster (or the officer whose duty it is) takes the plug and fits it securely in the socket, then gathering a small coil of line in his hand sings out "CLEAR GLASS!" if all clear (that is the sand all in one bulb) the answer from the glass holder is "ALL CLEAR!" The quartermaster sings out "STAND BY!" and throws the chip (and coil in his hand) over the lee quarter, clear of everything. The "chip" takes the line, and when the red rag passes the rail he sings out "TURN!" which the glass holder is to repeat, and at the same time turns the glass so that the bulb, with the sand in, is on top. The instant the sand is out of the upper bulb the glass holder must sing out "UP!" (sometimes giving a caution "stand by.") At the word "UP!" the line is stopped,

and the quartermaster notes the mark nearest the taffrail. If the 28-second glass was used, and the mark at the rail is 5 knots, then the ship is going 5 knots; but if the 14-second glass was used, this must be doubled, and the ship is going 10 knots. After the mark has been noted, the quartermaster gives the line a quick jerk to pull out the plug. The chip falls flat on the water, and the line is then hauled in and reeled up.

When is the long, and when is the short glass used?

The 28-second or long glass is generally used up to a speed of 5 knots. When the ship is going 5 knots or faster the 14-second or short glass is used. The short glass is used, simply to avoid running out a quantity of line, when the ship is going fast. *Always double the mark when the 14-second glass has been used.*

If, with the 28-second glass the mark at the rail is 4 knots and 2 pieces of white rag out, how fast is she going?

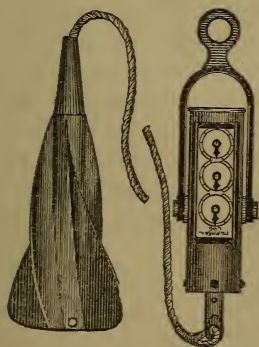
Four knots and four-tenths.

If with the 14-second glass the mark at the rail is 5 knots and 3 white rags out, how fast is she going?

Ten knots and six-tenths.

What other logs are used for determining the speed of a vessel?

Several patent logs, the most convenient of which is the "American Taffrail log." The dial of this log is connected by a small line with the Taffrail, and can be readily inspected at all times; particularly when changing the course of the vessel, the



"Taffrail Log."

necessity of hauling in is avoided.

What is a current log ?

The ordinary log, when used to determine the direction and velocity of currents. It is hove from the ship (or a boat), when at anchor, in the same manner as if under way. The mark on the line, at the rail, will give the rate of the current per hour. The bearing of the chip, (when out) by compass, will give the direction of the current.

What is a ground log ?

When cruising in shoal water, and the actual speed of the ship over the ground is desired, a lead or small grapnel is made fast to the chip end of the log line, and dropped overboard (in this case, the stray line must be long enough to allow the lead to reach bottom, before the glass is turned). The speed is then measured as before ; the end of the log being on bottom, the amount of line out will give the actual speed over the ground.

What is the log book ?

A record book kept by the officer-of-the-deck. It contains an official record of all transactions on board ship, such as drills, courts-martial, signals, accidents, punishments, articles received on board, etc., etc. The columns contain a record of courses steered, distances made, and leeway for each hour at sea ; also the direction and force of the wind, state of the weather, clouds and sea, height of the barometer, temperature of air and water for each hour at sea, or in port, the latitude and longitude at noon of each day at sea. The log book is signed for each watch by the proper officer-of-the-deck.

How is the state of the weather expressed ?

B—Clear blue sky.

C—Cloudy weather.

D—Drizzling or light rain.

- F—Foggy.
 G—Gloomy, or dark and stormy.
 H—Hail.
 L—Lightning.
 M—Misty.
 O—Overcast.
 P—Passing showers.
 Q—Squally.
 R—Continuous rain.
 S—Snowy.
 T—Thunder.
 U—Ugly, or threatening.
 V—Variable.
 W—Wet.
 Z—Hazy.

How is the state of the sea recorded ?

- B—Broken, or irregular sea.
 C—Chopping, or short sea.
 G—Ground swell.
 H—Heavy sea.
 L—Long, rolling sea.
 M—Moderate.
 R—Rough sea.
 S—Smooth sea.
 T—Tide rips.

Wind Scale.

<i>Force of wind.</i>	<i>Nautical designation.</i>	<i>Velocity of wind in miles per hour.</i>
<i>Nautical scale.</i>		
0	Calm	0
1	Light airs	1 to 2
2	Light breezes	4
3	Gentle breezes	9

4	Moderate breezes	14
5	Stiff breezes	17
6	Fresh breezes	20
7	Very fresh breezes	24
8	Moderate gale	30
9	Strong gale	40
10	Very strong gale	67
11	Violent gale	80
.	$\left\{ \begin{array}{l} \text{Hurricane} \\ \text{Typhoon} \\ \text{Cyclone} \end{array} \right\}$	100 and upwards.
12		
.		

How are the clouds recorded?

“*Cir*” for “*cirrus*,” are light, feathery clouds, in clear weather.

“*Cir-cum*” for “*cirro-cumulus*,”—small, round, white clouds.

“*Cir-str*” for “*cirro-stratus*,” consist of feathery clouds, in layers of considerable extent.

“*Cum*” for “*Cumulus*,” large white clouds, look like huge heaps of snow.

“*Cum-str*” for “*cumulus-stratus*,” clouds giving the horizon a bluish-black color. Seen in dry, windy weather, towards night.

“*Nimb*” for “*nimbus*,” heavy rain clouds.

“*Str*” for “*stratus*,” an extended, horizontal layer of clouds, increasing from below.

The scale for denoting the amount of cloud is from 0 to 10; 0 is a clear sky; 5 a half covered sky, and 10 a sky wholly covered.

What is a log slate?

A slate, sometimes used to keep a temporary record of the log, which record is copied daily into the log-book.

What is the rough or deck log?

The log-book for daily use. It is carried on deck when needed.

What is the smooth log?

The smooth copy of the rough log. It is signed in full by the proper officers, and every six months, one must be sent to the Navy Department.

SEAMEN'S PROVERBS.

"A red sky in the morning,
Sailors take warning;
A red sky at night
Is a sailor's delight."

"The evening red and morning gray
Are sure signs of a fine day;
But the evening gray and morning red
Make the sailor shake his head."

"With the rain before the wind,
Your topsail halliards you must mind;
But when the wind's before the rain,
You may hoist your topsails up again."

"Long foretold, long last,
Short notice, soon past."

"Rainbow in the morning,
Sailors take warning;
Rainbow at night
Is a sailor's delight."

"Mackerel skies and mare's tails,
Make lofty ships carry low sails."

"If Bermuda lets you pass,
Then look out for Hatteras."

"A dead calm often precedes a violent gale."

"Porpoises swim towards the coming breeze."

"When the wind veers against the sun,
Trust it not, for back it will come."

"When the sun sets in a clear
An easterly wind you need not fear."

Lightning in south'ard and westward, in, or off, the La Plata river, is one of the common signs of a "*Pampero*."

Lightning from N. N. E. to N. N. W., in the Gulf of Mexico, during hurricane months, is a common sign of a "*Norther*."

Lightning in the S. W. during the winter months, in the Gulf of Mexico, is a sure sign of a "*Norther*."

Barometer.

First rise after very low
Indicates a stronger blow.

Relating to the Hurricane Months in the West Indies.

June, too soon ;
July, stand by ;
August, look out you must ;
September, remember ;
October, all over.

CHAPTER IX.

THE GENERAL FITTINGS AND LEAD OF THE STANDING RIGGING.

The following methods of rigging the masts, yards, and booms, are those now in use in the navy.

It is not proposed, at this stage, to instruct the apprentice in "*cutting and fitting rigging*," but simply to give him a practical idea of how masts, yards, and booms are rigged, in the vessels of the present day.

Hemp rope was formerly used for standing rigging, but now galvanized wire rope is used entirely.*

All standing rigging to be 4-stranded, shroud-laid, galvanized wire rope; to be wormed, parcelled, and served from end to end, as a protection against wear and tear, except stays on which sail is carried.

Upper dead-eyes for lower and topmast rigging are to be strapped with iron, and to have a stout galvanized-iron-scored heart (Walton's) at the upper part of the strap to receive the rigging, the end of which, being passed up, is to be secured by five seizings, the two lower ones passed with racking under-turns; the lower dead-eyes to be connected with the chain-plates by bolts, so that they may be readily unshipped. Lower stays are to pass over an iron-scored heart, the ends to be secured like the ends of lower and topmast rigging, with at least five seizings, the two lower ones passed with racking-turns.

All standing rigging to be set up by laniards.

* Steel wire, for standing rigging, has lately been introduced in the navy.

BOWSPRIT.

What are the principal supports of the bowsprit?

The bobstays; there are three of them, inner, middle, and cap or outer bobstay.

How are they made, and where set up?

Formerly made of chain, but are now made of wire rope. They are shackled to plates and bolts, at the cut-water, and set up with laniards and four-scored hearts, shackled to iron bands on the bowsprit.

How do the bowsprit shrouds lead?

They are of wire rope, shackled to eye-bolts on each bow, and set up with laniards and hearts, that are shackled to an iron band just outside of the bobstays, near the head of the bowsprit. To give the proper support, bowsprit shrouds must be in line with the heel of the bowsprit.

How is the jib-boom fitted for rigging?

It has an iron band or wythe, which fits over at the hounds. This band has three eyes or bolts in it, one on each side and one underneath.

How do the jib-guys lead?

They shackle to the eyes, on each side of the band or wythe on jib-boom, lead to, and fit over, the end of each whisker-boom with a horse-shoe cringle. They set up with laniards and hearts, well aft on the bows, or to the cat-heads.

How does the jib-martingale lead?

It shackles to the under-eye of the wythe on jib-boom, and shackles to the band on the end of the dolphin striker.

How is the flying-jib-boom fitted for rigging?

The same as the jib-boom, with an iron wythe having three eyes.

How do the flying-jib guys lead?

They shackle to the side eyes on the wythe, reeve through

thimbles or bull's eyes on the end of the whisker-booms, and set up (well aft) to the bows or cat-heads, with laniards and hearts.

How does the flying-jib-martingale lead?

It shackles to the under-eye on the flying-jib wythe, and reeves through a sheave in the end of the dolphin striker, and sets up with laniards and dead-eyes in the "head."

How are the foot-ropes for the jib and flying-jib-boom secured?

The forward ends are seized to the shackle of the jib and flying-jib guys. The after ends of the foot-ropes, on the jib-boom, are seized to the bowsprit cap, and those for the flying-jib-boom, to the wythe or band on the end of the jib-boom.

How do the whisker jumpers lead?

They fit over the ends of the whisker-booms with an eye splice, and set up to their own parts through bull's eyes or thimbles secured by bolts to the sides of the cutwater. In straight stemmed vessels they lead to the "dolphin striker."

What are the back ropes? How do they lead?

Back ropes are of *hemp*, hooked, or shackled to a band on the end of the dolphin-striker, and set up at the "bluff of the bows" with laniards and hearts.

LOWER RIGGING.

The rigging over the heads of the lower masts is the same for fore, main, and mizzen, except that the mizzen is only fitted with a single stay, while the fore and main stays are double. The oak bolsters are now sometimes done away with, and the trestle trees rounded and covered with composition, as a substitute.

What is the first rigging over the lower mast head?

The mast head pendants; they go over as a pair, connected on each side of the mast head, by cross lashings or seizings of wire. They are fitted with a link in each end. Both legs are the same length.

What follows the lower pendants?

The lower shrouds. These go over in pairs, No. 1 pair on the starboard side; No. 2 pair on the port; No. 3 pair on the starboard, etc., etc.—the odd-numbered pairs being on the starboard side, the even-numbered on the port. The eye that fits over the mast head, is made by seizing the two parts, of each pair, with an eye seizing. The lower ends of the shrouds, set up with laniards and dead eyes in the chains.

In case there is an odd shroud, where does it go?

It should be the forward shroud, and fitted with a single eye for strength and neatness.

How is the number of shrouds determined?

By the "scale draft" or construction drawing of the ship.

What goes over the lower mast head, next after the shrouds?

The lower stays; there are two of them on the fore and main, and but one on the mizzen; each stay is fitted singly with split collars and lashing eyes, the fore and main seized together *at the collars*, the *starboard stay on top*, the port stay coming next to the shrouds, when on the mast head. The lashings, securing the collars of the stays to the mast head, are passed through the eyes and abaft the mast head. The fore stays, set up with laniards and hearts, to large iron bolts on the bees of the bowsprit. The main stays set up with laniards and hearts to heavy iron bolts, called main stay bolts, on each side of the fore mast. The mizzen stay is

single, and sets up with laniards and hearts at the main mast. In vessels fitted with trysail masts, frequently the foot of the mizzen stay is *split*, and two legs or parts formed, having thimbles turned in each. These legs set up by laniards, to bolts on each side of the main mast.

TOPMAST RIGGING.

Topmast rigging goes over the mast-head in the same order, and is fitted in the same manner, for the fore, main, and mizzen topmasts, with the exception that the fore has, in addition, a jib-stay, which fits over last. The mizzen topmast stays and backstays are single, while the fore and main are double.

A cast composition funnel, $\frac{1}{4}$ -inch thick, is now fitted to go over topmast heads; the topmast rigging is fitted over this funnel.

Bolsters are of *oak*, bolted to the trestle trees, and are covered with a rounded piece of composition, which is a *part of the funnel*.

What rigging is first over the topmast head?

The burton pendants; they are fitted the same as the lower pendants. Frequently burton pendants are fitted of chain or wire of proper length, and hook to eye-bolts in the under side of the topmast trestle trees. They have a large link in the lower end, for burtons to hook to. This method of fitting weakens the trestle trees, and is gradually being done away with.

What follows the burton pendants?

The topmast shrouds. They are fitted in the manner known as "*straight*," with one eye, formed out of two pairs of shrouds. This method, gives two lifts or thicknesses on the mast-head, with four shrouds on each side, making a

neat, snug mast-head. The topmast shrouds, set up with laniards and dead-eyes on the top rim.

What follows the topmast shrouds ?

The topmast backstays ; fitted double or in pairs, for the fore and main, with an eye seizing the same as the lower shrouds. The starboard backstays go on first, followed by the port ones. The mizzen topmast backstays are single, one backstay on each side going over the mast-head with single eyes. Topmast backstays set up with laniards and dead-eyes, in the chains, abaft the shrouds.

What follows the topmast backstays ?

The topmast stays. They are fitted separately with split collars and lashing eyes, and then seized together at the collars, the same as the lower stays ; the starboard stay on top, the port one being next to the backstays, when on the mast-head. The fore-topmast stays lead through the bees on the bowsprit, and set up with laniards and hearts on each side of the "bluff of the bows." Vessels fitted for ramming, the fore-topmast stays reeve through *chocks* at the bees, for convenience in rigging in the bowsprit. The fore-topmast staysail, sets on the lower or port fore-topmast stay, which is sometimes known as the "*spring stay*." The main-topmast stays lead through composition rollers in the after part of the fore trestle trees, and set up with hearts and laniards to heavy bolts in the spar deck, abaft the foremast. The mizzen topmast stay leads down and sets up, with hearts and laniards, in the main-top.

On the fore topmast head, what follows the fore topmast stays ?

The "jib stay ;" it is fitted with split collar and lashing eyes, and is seized on top and to the collar of the topmast stay to prevent chafe from the foot of the topgallant sail.

The jib stay leads through the end of the jib boom, down through a clamp, called a duck-bill, on the dolphin-striker, and sets up with hearts and laniards in the "head."

TOPGALLANT RIGGING.

A composition funnel, with arms called a "jack," goes over the topgallant mast heads, for the rigging to fit on. All topgallant masts are fitted the same, except that the flying jib stay goes over the fore, after the topgallant stay.

What is the first rigging over the topgallant mast head?

The topgallant stay, which fits over the funnel, with an *eye-splice*. The fore, reeves through the sheave in jib boom, down through a clamp on the dolphin-striker, and sets up with dead eyes and laniards in the "head." The main topgallant stay, leads through a sheave in the after chock of the fore topmast trestle-trees, and sets up, in the fore top, with laniards and dead eyes. They sometimes lead directly to a hole in the fore cap, and then to the top. The mizzen topgallant stay leads to a hole in the main cap, and sets up in the main top with laniards and dead eyes.

What follows the fore topgallant stay?

The flying jib stay; it goes over with an *eye-splice*, and leads down through the hole or sheave in the flying-jib boom end, and through the clamp on the dolphin-striker to the "head," where it sets up with laniards and dead eyes.

What follows the fore-and-aft stays on the main and mizzen, and the flying jib stay on the fore?

The shrouds. They are fitted in pairs with an "*eye seizing*," like the lower rigging. There are two (2) pairs, the starboard going over first, then the port pair, both fitting snugly down on the funnel. The forward and after leg of each pair of shrouds, lead through the horns, or outer ends, of the topmast cross-trees, down between the

topmast shrouds (just below the eyes of the rigging) and over the futtock staff; they set up with laniards and dead eyes in the tops. Topgallant shrouds are sometimes fitted to reeve through an eye bolt and thimble, of a band, on the lower part of the topgallant funnel, a pair on each side; the two legs of each pair are seized together the same as the lower shrouds, with an eye seizing; this method gives a good support and a much neater mast head.

What follow the topgallant shrouds?

The topgallant back stays. There are two of them, one on each side, fitted singly with eye splices. The starboard backstay goes over first, followed by the port one; they lead down, and set up with laniards and dead eyes in the chains, abaft the topmast backstays.

Why should a topgallant stay go on the funnel first?

In order that it may be placed as low down as possible, to prevent chafing the foot of the royal.

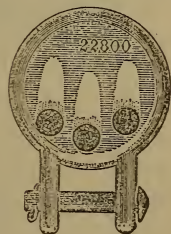
ROYAL RIGGING.

How is royal rigging fitted?

If fitted to go over the mast head, it goes in the same order as the topgallant rigging. But vessels of the navy are fitted with an iron wythe, band, or telescopic funnel, (which telescopes, or fits in, the topgallant funnel, when the masts are down) which goes over the hounds of the royal mast; this band or funnel has three eye bolts, one forward, and one on the starboard and port sides. The *shrouds* and *backstays* are in one piece (on each side), and reeve through the side eye bolts, being seized around a thimble there. Sometimes they shackle to the eye bolts. The royal *shrouds* reeve through the ends of the jack, and set up with dead eyes and laniards in the top. The *back-*

stays lead down abaft, and set up, with dead eyes and laniards, abaft everything, in the chains.

The royal stays, are spliced or shackled, to the eye bolt, in the forward side of the band or funnel. The fore, leads through the end of the flying jib boom, through a clamp on the dolphin-striker, and sets up with dead eyes and laniards in the "*head*." The main, leads through a chock in the after part of the fore topmast trestle-trees, and sets up with dead eyes and laniards in the fore top. The mizzen, leads through a chock in the after part of the main topmast trestle-trees, and sets up with dead eyes and laniards in the main top.



Upper dead eye. The shrouds and back-stays of the U. S. S. "*CHICAGO*," and the other new vessels that are now being built for the navy, are to be set up, with dead eyes and laniards, *inside* the bulwarks *Lower dead eye.* of the vessels, in order to have everything clear for the fire of the heavy guns.

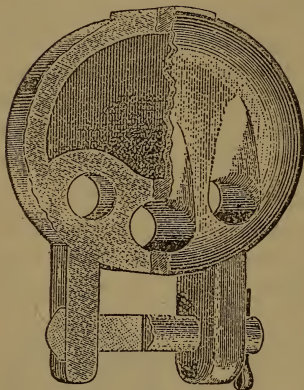
The old method of "*turning in dead eyes*" is to be done away with, and "*Healey's Patent Metallic Splice*" will be substituted.

UPPER AND LOWER DEAD EYE.

These cuts represent an upper and lower dead eye (Healey's). Being hollow, they are lighter than those made of *lignum vitæ* with the rope or iron strap passing

around them. The process of detaching the upper dead eye for the purpose of shortening the shroud is simple and expeditious.

Extract of a report made by the equipment officer of the Boston Navy Yard, (Commander A. O. Batcheller, U.S. N.)



The above cut shows a lower dead-eye with a portion of the exterior shell removed, exhibiting the interior cavity.

“The results of the tests may be briefly summarized as follows:”—

“1st. *Strength.* The patent splice is stronger than the common splice, and stronger than the rope itself.

“2d. *Durability.* The patent splice is more durable than the common splice, affording, as it does, a perfect protection to the rope, while in the common splice the rope is much opened and liable to admit water, even when carefully served.

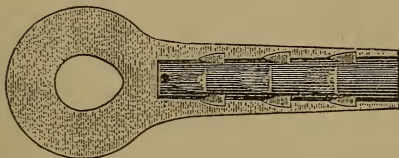
“3d. *Economy.* Without going into the relative cost of making the patent and the common splice, for which I have no positive data, there is an economy in using the former, as there is no waste of rope. I am of the opinion, however, that unless the charge for *royalty* is too high, the great economy will be in the cheapness with which the patent splice can be made.

“4th. *Neatness.* The patent splice can be made neater than the common splice.”

This method of “metallic splicing” can also be used for splicing wire rigging when shot or carried away. The whole splice can be completed in the space of a few moments, after

melting the metal filling. It can also be used in fitting "foot ropes," "stirrups," "back-ropes," etc., etc., fitting sister-hooks, and an almost endless variety of rigging.

ROUND EYE SOCKET.



The above cut shows a longitudinal section of a round eye socket, showing the arrangement of the inside notches into which the filling metal sets, securing it so firmly that no force can draw it. Sockets without these notches have been tested, and the fact established that they are sufficiently strong without them; but these are added so that nothing, which might contribute to the strength and safety of the splice, may be omitted.

ROUND EYE SOCKET.



The above cut represents a round eye socket. These are applicable to every use of a wire rope when it is desired to make a simple connection with it.

There have been made more than a hundred tests of this method of fastening wire ropes at the United States Arsenal, Watertown, Mass., South Boston Iron Works, Estabrook's Chain Works, South Boston, Fearing's Chain Works, East Boston, and at other places, from which the fact has been demonstrated that the metallic splice is not

only the strongest made, but stronger than the rope itself, which is by no means the case with the old style tucked splice or the other methods in use.



*Metallic socket
in cross sec-
tion.*

This cut shows the metallic socket in cross section. It illustrates most clearly the solidity of the metallic combination. No interstices anywhere, but the union of socket and wire rope is complete.

DIRECTIONS FOR MAKING THE PATENT SPLICE.

First, measure the depth of socket, and cut the same length from the hemp heart of the rope.

Second, have a sufficient quantity of filling metal being melted.

Third, insert the end of rope into the socket, and hold it in a horizontal position over a strong heat until a piece of the filling metal will melt when held on the *upper* side of socket, and until the rope becomes too hot for the hand at three inches distance from the socket. Have the filling metal hot enough to ignite a shaving or piece of paper when brought in contact with it.

Fourth, place the splice with the rope inserted in an upright position and pour the socket full, and let it remain in position until cool, when it is ready for use.

THE KIND OF FILLING METAL TO USE.

Pure tin, or a compound of half lead and half tin, or the latter compound with two *per cent.* of antimony added.

Either of these three may be used with the utmost safety, and is obtainable in any part of the world.

Any apparatus for melting the metal and heating the parts may be used.

THE RIGGING OF YARDS.

Yards are now rigged with iron bands having ears or oblong eyes, to which the lift, brace, tye and other blocks hook, with heavy iron sister-hooks or shackle.

What are sister-hooks?

A pair of hooks working on the same ring, which, when closed, form an eye or ring in themselves.

How are lower and topsail yards fitted?

Strong iron bands encircle the yards. These bands have heavy ears, eyes, bars, etc., to which the different blocks hook and shackle.

What are the principal bands on the fore and main yards, commencing at the slings?

One sling band for the slings; two truss bands, one on each side, for the truss; two quarter bands, one on each side, for quarter blocks; two bands, one on each side, for the burtons; two lift and brace bands, one on each yard arm, for the lift and brace blocks.

How is the lift and brace band rigged?

It fits over at the shoulders, and has two heavy ears or eyes, and a peculiar shackle; one ear on top and the other ear and shackle abaft. The lift block hooks to the top ear. The brace block hooks to the after ear. The shackle is for the foot rope. (See fig. of lower yards.)

Where do the quarter blocks hook?

Underneath the yard, on each side of the slings.

How do the brace bands on the mizzen topsail and cross-jack yards differ from other yards?

The ears or eyes for the brace blocks, are on the forward side of the yards.

What bands are fitted for topsail yards?

Two bands for tyes; two bands, one on each side, for quarter blocks; two bands, one on each side, for burtons; two lift and brace bands, one on each yard arm.

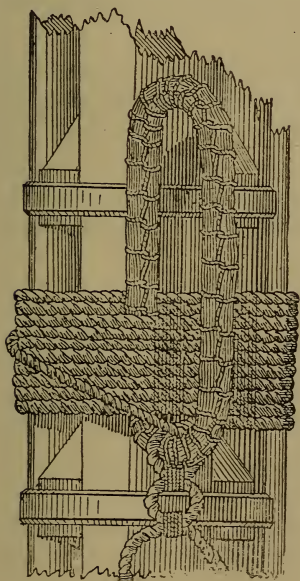
How are top-gallant and royal yards fitted?

With bands at the slings for the yard ropes, and bands for the quarter blocks. The lifts and braces, fit over the yard arms with eyes formed in each, and marled together; or an iron ring or spectacle fits over, the lift and brace being seized to it.

CHAPTER X.

RIGGING SHIP.

The following methods of rigging ship are those usually employed by navy-yard riggers. The ship is supposed to be lying at the navy yard, *starboard side to the dock*.



"Garland and Lashing."

Before turning a ship over to the riggers, the construction department is required to *step the lower masts, with trestle-trees and tops in place*. And also to step the bowsprit with the cap in place, and set up the gammoning.

The ship is hauled under the sheers. The bowsprit and lower masts, are hung slightly heel-heavy with a garland and lashing. And they are stepped in their proper places, using the heavy sheers purchase, assisted by shore and other guys. It is not recommended to white lead the mortice and tenon, but simply to use tallow.

In rigging, we will suppose the bowsprit, with cap, is in place, gammoning set up, the lower mast stepped with

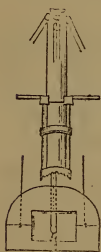
lower trestle-trees on. Not unfrequently riggers are obliged to send up tops, therefore, that will be explained.

After the rigging is put over the mast-head it is *set up as usual*; but to avoid confusion, the fact of its being set up is simply stated in this chapter, and a detailed description of the methods of setting up rigging will be given later on.

The manner of rigging the foremast only, is explained, The main and mizzen masts, are rigged in precisely the same way.

The first thing to be done, is to rig and secure the bowsprit. The bobstays and bowsprit shrouds are fitted and set up.

Almost invariably, as soon as the bowsprit is secure, the *topmasts* are pointed, and used as derricks for shipping the tops, caps, getting over lower rigging, etc., etc. This is an excellent plan, particularly if short-handed, or if rigging large vessels; but on board the training-ships or smaller vessels the following methods would answer every purpose.



TO GET OVER THE FORE TOP.

Lash single blocks, for girtlines, to the tenon of the lower mast-head, one on each side. Place the top on end *abaft* the mast, the round or *forward side* uppermost, upper part of the top aft. Reeve the girtlines through the mast-head blocks,

and bend them to the *under side* of the top with round turns and hitches on each side of, and near the centre of the lubber's hole; or in such a position, that after the top leaves the deck, it will nearly balance up and down; to prevent the turns and hitches from slipping, seize them to the holes in the futtock plate.

“Sending up a whole top.”*

* The dotted lines represent ropes on the under side of top.

To a strap placed, well forward, around the tenon of the mast, hook the upper block of a tackle, the lower block of which is taken forward of (or underneath) the top, and hooked to a strap passed around the centre of the after (or lower) rim of the top. This tackle is to assist in canting the top into a horizontal position over the mast-head. Now reeve a small *after guy* through a block secured to the *main mast-head*, and make fast the forward end of this guy to the forward (or upper) part of the top rim. This guy will keep the top clear of the lower trestle-trees in going aloft.

When all ready, MAN THE GIRTLINES! SWAY ALOFT! take in the slack of the canting tackle, or put a strain on it if necessary; guy the top clear of the lower trestle-trees with the after guy. When the top is high enough to cant over the mast-head, HIGH ENOUGH! take a turn with the girtlines.

Man the canting tackle and pull up *handsomely*, tend, and slack the girtlines and after guy at the same time. As soon as the top is canted *square* and *fair*, LOWER AWAY TOGETHER! place the top and bolt it to the trestle-trees.

By this arrangement there is no necessity to have a man aloft, until *after* the top is lowered over the mast-head.

It is sometimes found useful to have a *forward guy*, leading from the forward (or upper) top rim to the bowsprit end. It will aid in canting and setting the top in its position.

There are several methods of sending up tops; the above, however, is in every way suited for the training-ships. Tops are sometimes shipped by "half-tops," particularly when rigging large vessels; each half-top being sent aloft on its own side of the mast, by bending a girtline around the centre of the top, at the lubber's hole.

TO GET OVER LOWER RIGGING.

As soon as the top is over and bolted down, the bolsters being in place, or the trestle-trees rounded off and covered with composition; the lower rigging is sent up by means of the mast-head girtlines (those used for the top), which are taken down, through the lubber's hole, on each side of the mast. Other girtlines, rove through tail blocks secured around the lower trestle-trees, on each side, will assist very materially in the work.



*Sending up
"half-tops."*

The rigging goes over the *lower mast head*, in the following order: Lower pendants, shrouds, and fore-and-aft stays last, or on top of all.

The lower pendants are first sent up, using the girtlines to place them over the mast head, bear them well down on the trestle trees and bolsters, and fit them snugly into their place.

All rigging should fit, so that it *will not be necessary to beat it into place*; however, should that become necessary, use a commander (a heavy wooden maul) always holding a piece of leather, over the rigging, to strike on and prevent bruising.

Now, bend the starboard girtline to the first pair of shrouds (No. 1 starboard) five or six feet *below the eye seizing, on top of the shrouds*, and seize the girtline to the *top or centre* of the eye, *bend the eye down* in the proper direction, so that it will go over the mast head readily. If the shrouds are heavy, the girtline at the starboard trestle-trees should be bent on about half way down the shrouds, to assist in hoisting.

Now man the girtlines and SWAY ALOFT! when high enough, the man at the mast head signifies it, cuts the stop

at the *top of the eye*, places the eye over the mast head, and as the girtlines are lowered, he follows it down, placing it fair and neatly in its place. Now send up the next pair of shrouds (No. 2 port) in the same manner. Then send up No. 3 starboard, and so on, until all the shrouds are in place. The main and mizzen shrouds are sent aloft in the same way.

Now proceed to send up

THE LOWER STAYS.

The lower stays have been seized together (at the collar) in the rigging loft, the *port stay* underneath.

After the shrouds are all over and down in place, the ends of each mast head girtline, being down through the lubber's hole; send a heavy girtline down, forward of the top; the light ones are bent on *each side* of the stays, two or three feet below the crotch of the collar, and stopped with spun yarn stops, at intervals of about three feet, along each leg (or side) of the collar. Bend on the heavy girtline, below the collar of the stays. Clap good stops on the lashing eyes. When all ready, SWAY ALOFT! when high enough, the men in the top cut the stops and bear down the lashing eyes in their proper position, then pass the lashing (the stays in the meantime being held up by the heavy girtline).

The main and mizzen stays, are sent up in the same manner.

Now set up the lower stays, then set up the lower rigging and "rattle down."

The tops are now over, lower rigging, and stays set up, proceed to

SEND UP THE FORE-TOPMAST.

The topmasts are supposed to be on the wharf, with the head forward, and after sides uppermost.

Lash a top block at the lower mast-head, and reeve the end of a small hawser, *from aft forward*, through this block, outside and forward of the top, through the closed sheave, near the heel of the topmast, up, and secure the end with a clove-hitch, around the head of the topmast. Now bring the bight, or hauling part of the hawser, into the topmast, rack it to the standing part, and secure it near the clove hitch, with a *stout lashing*. Have a good shore guy bent on to the mast, and also a fore-and-aft guy. When all ready, MAN THE HAWSER! HOIST AWAY! and walk the mast *up*, and *inboard*, tending the shore, and fore-and-aft guys; point the head of the mast through the lower trestle-trees, resting the heel on deck. It frequently happens, however, that there is not room enough to do this, in which case, the mast must be swayed high enough, outside the top rim, to point the heel down through a scuttle in the deck, just forward of the lower mast; and the mast then lowered sufficiently, to point the head through the hole in the trestle-trees; after which, rest the heel on deck.

Now pass a stout strap through the fid hole, near the heel of the topmast, and "*hang the mast*," by hooking the pendant tackles to this strap, on each side of the topmast, and setting both well taut.

Unlash the top block from the mast-head, and unreeve the hawser.

The topmast is now "*pointed*," and hanging by the pendant tackles, proceed to

SEND UP THE LOWER CAP.

Overhaul the girtlines, down *forward of the top*, and secure them to the forward side of the cap, *bolts up*, (so they will not come in contact with the top rim in the cap's passage aloft), and stop the girtlines to the square or after hole of the cap; bend a small line on, leading forward, with which guy the cap clear of the forward rim of the top. When ready, MAN THE GIRTINES! SWAY ALOFT! and when high enough, LOWER AWAY! and place the *round hole* of the cap, (through which the topmast passes), over the square hole of the trestle-trees, *bolts of the cap down*; remove the mast-head girtlines.

Now man the pendant tackles, SWAY UP! handsomely, and lash the cap securely to the topmast-head, *bolts down*. SWAY HIGHER THE TOPMAST! when the cap reaches just above the tenon of the lower mast-head, *slue* the topmast (with a heaver placed in the fid hole, or a capstan bar at the heel), sufficiently to bring the square hole of the cap directly over the tenon of the mast, *fair for shipping*; tallow the tenon and mortise, place the capshore forward of the lower mast, fair for shipping, and when all ready, *slack handsomely* the pendant tackles, lower the topmast, placing the cap properly, and beating it well down. Tack a piece of sheet-lead over the top of the cap as a protection from the weather. Hook the top blocks in their places, to the bolts in the under side of the cap, one on each side, and reeve the top pendants as follows:

One end of the top pendant is pointed, the other has a thimble in it. There are two pendants for the fore and main, and one for the mizzen topmast.

Reeve the pointed end of the *port* pendant, through its top block, under the lower cap, from *aft forward*, down

through the trestle-trees, and through the *upper sheave* in the topmast ; back through the opposite side of the trestle-trees, and secure the end *over* the lower cap, *not to the bolts*, having the cap well parcelled, or better still, have a mat placed there to prevent chafing the pendant ; reeve the starboard pendant in the same manner, through the lower sheave of the topmast. (For the main topmast, the *starboard* pendant is rove through the upper sheave, while the mizzen top pendant reeves on the *port side*.) Hook heavy tackles (usually pendant tackles), for top tackles, to the thimble ends of the pendants and set them well taut, taking the weight of the topmast. Slack up the lower pendant tackles, and remove the fid strap. Now proceed to

SEND UP THE TOPMAST CROSS TREES.

Cast off the lashings of the lower cap (from the topmast head), man the *top tackles*, and sway the topmast a few feet above the lower cap.

Lash two girtline blocks to the tenon of the topmast, (having the falls rove off.) Place the cross-trees on deck, *well abaft* the mast ; overhaul the girtlines down abaft, and make fast the ends to *each after horn*, close to the trestle-trees, stopping the bights to the forward horns ; have an after guy leading to the mainmast head, or well aft on deck, to keep them clear of the after top rim, in the passage aloft. MAN THE GIRTLINE ! SWAY ALOFT ! using the guy to keep the cross-trees clear of the mast and top. Land the cross-trees on the lower cap, the forward part inclining upward, and resting against the topmast ; in this position, *lash the after horns* to the lower mast head to keep them steady. Cast off the girtlines, and remove the girtline blocks from the topmast head ; tallow the cross trees, and the topmast at the hounds, in the wake of the cross trees.

Now *lower handsomely*; (hands being stationed at the lower cap), the topmast is slacked down, until the cross trees are *eased* fair over the mast-head, the after horns being still secured to the lower cap. Now cut this lashing, sway up on the topmast, and lodge the cross-trees on the hounds of the topmast, bearing them well down in their places. Proceed to

RIG THE TOPMAST.

The rigging goes over the topmast head as follows: First, burton pendants, shrouds, then backstays, and last the fore-and-aft stays.

Lash girtline blocks, with falls rove off, to the tenon of the topmast head. The gin-bar being securely in its place, shackle the topsail tye blocks.

Now, sway up, and heave the hounds of the topmast clear of the lower mast, and, with the girtlines, send up the topmast funnel and place it. Then send up the burton pendants (if fitted to go over) shrouds, backstays, and fore-and-aft stays, in the same manner precisely as the lower rigging is sent up, except that the topmast rigging is sent up *abaft* and *outside* the top; after which, shift the girtlines to the after horns of the topmast cross trees.

As before explained, the topmast and jib-stays are seized together at the collar, in the rigging loft, the jib-stay on top; they consequently are sent aloft together.

Soft wood bolsters are no longer used. Oak bolsters are bolted to the trestle-tree, and are covered by the lower part of the topmast funnel, which is rounded off to fit over them.

The burton pendants were fitted to hook or shackle to eye-bolts in the under side of the topmast trestle-trees, but they are now being fitted the same as the lower pendants.

Reeve the topmast stays through the bees in the bowsprit, and seize in the hearts. With bowsprits fitted for ramming they are placed in *chocks* at the bees, so as to be hove out quickly when rigging in the bowsprit.

SHIP THE TOPMAST CAP.

A convenient way to ship the topmast cap is to lash girtline blocks, with falls rove off, at the topmast-head (*well aft*). Overhaul the girtlines down *before all* and make fast the ends to the *forward bolts* in the cap (*bolts down*) stopping the bight to the after bolts. Man the girtlines. SWAY ALOFT! When high enough the men at the mast-head cut the stops to the after bolts, tallow the mortice and tenon, SWAY HIGHER! and the cap is easily placed over the the mast-head. The girtline blocks are then removed and made fast to the bolts under the cap.

A topmast cap may be shipped when the topgallant-mast is sent aloft, in the same manner the lower cap was shipped, by slueing the mast, etc., etc. The other method, however, is much more convenient. Topgallant-masts are sometimes used in the same manner as topmasts, when rigging ship, particularly in large vessels.

After shipping the topmast cap, man the top tackles, SWAY UP AND FID! set up the rigging.

The methods above described, of rigging a topmast *before fidding* will answer very well for the training-ships—and small vessels generally—but in large vessels it is *safer* and *better* to rig the topmast "*on the fid*" (after being fidded).

The main and mizzen topmasts are sent aloft and rigged in precisely the same manner.

RIG OUT THE JIB-BOOM.

The jib-boom is on the dock, *heel aft, topside up*. Hang

the boom a little *heel heavy* by means of a stout strap or lashing, which is taken around the boom near its centre; reeve a backer through the sheave in the boom to keep the strap from slipping. To the strap, hook the lower block of the pendant tackle; have a shore and fore-and-aft guy made fast to the boom. Man the pendant tackle, tend the guys, and sway the boom on board, pointing the head between the stays, *through*, and about two feet beyond, the bowsprit cap.

Reeve the jib-stay, on which the hanks have been strung, through the sheave hole near the end of the jib-boom, and proceed to reeve the heel-rope, first unhooking the pendant tackle, and casting off the lashing and guys.

Take the end of the heel-rope from *out in* through a strong single block, which is hooked on the port side of the bowsprit cap, then through the sheave hole in the heel of the jib-boom from *port to starboard*, and clinch the end to a bolt on the starboard side of the bowsprit cap.

The whisker-booms should now be placed, and triced up by jiggers hooked to the foretopmast stays; the dolphin-striker hooked (with martingale stay and back ropes attached to the band). Now place the *iron band* over the hounds of the jib-boom. The jib-guys and martingale stays have already been shackled to this band. Seize the outer ends of the foot-ropes to the eyes for the jib-guys, the inboard ends being secured to the bowsprit cap; place the *wythe* for the flying-jib-boom. Man the heel-rope, and RIG OUT! a whip from the topmast-head will assist in getting the heel in place, or sometimes a Spanish windlass rigged across the topmast stays is used. As soon as the heel is well down in its mortice, clamp and secure it.

Now place the rigging over the whisker-booms as follows:

whisker-jumpers, jib-guys, and the strapped bull's eyes of the flying-jib-guys; then set up the rigging, first the back-ropes, then the whisker-jumpers (temporarily), and the jib-guys last. Regulate the *droop* of the whisker by the jumper, slacking the tackles.

The topmasts are now up, jib-boom rigged out, and all rigging set up. We are now ready to cross topsail yards.

Sometimes topgallant masts are sent up and fiddled before the topsail and lower yards are across. But the general custom is to cross topsail yards, send up lower yards, and afterwards to send up topgallant-masts and cross topgallant and royal yards.

TO CROSS TOPSAIL YARDS.

The topsail yards having been fitted at the loft with foot-ropes, stirrups, parrels, flemish-horses, and all iron work, including the gin-blocks on top for the tyes and quarter blocks under the yard, are brought to the wharf or dock, and are placed abreast their respective masts, the port yard-arms outboard or towards the ship, *jaws aft*.

Hook the topsail lifts to the lift's bolts on the yard, and stop them down with rope yarns to the jackstay on top of the yard. Pass a strong lashing around the topmast-head *below* the collar of the stay, to this lashing hook the upper block of a *strong double* tackle, (sufficiently heavy to handle the lower yard also) the lower block of which, is hooked to a stout strap, which has been passed around the centre of the yard and *well lashed* down to the port quarter. Overhaul down the top burtons, and hook them to their respective quarter straps on the yards.

Take the hauling part of the double tackle or *topmast-head tackle*, to a leader near the topsail sheet-bitts, and station hands to take in the slack of the top burtons as the

yard goes aloft. Make fast a strong shore-guy to the yard, set it taut, and take a turn for *easing away* as the yard leaves the dock, also make fast a fore-and-aft-guy, to keep the yard clear of the top. Reeving lines for the lifts are rove through sister blocks in the topmast rigging, and led down into the tops. When all ready, MAN THE TOP-MAST-HEAD TACKLE AND TOP BURTONS! SWAY ALOFT! easing the shore-guy and tending the fore-and-aft guy. When the centre or slings of the yard is clear of the lower cap, AVAST HOISTING! come up the quarter lashing, bend the reeving lines to the pointed end of the lifts, cut the stops, and reeve the lifts through the sister blocks in the topmast rigging, get the port or *upper* lift down to about the square mark, hook the upper or port brace block (with brace rove off), and mouse it, sway higher, until able to hook the lower or starboard brace block (with brace rove off), mouse it, and at the same time get the starboard or lower lift down to the square mark. Now lower away together, tending the burtons, easing down the port burton and hauling on the starboard one; bring to and jaw the yard; unhook the topmast-head tackle from the yard, and overhaul it down for the lower yard; reeve off the tyes, pass the parrel, pass the foot-ropes abaft the mast and seize off; square the yard.

The main and mizzen topsail yards are crossed in precisely the same manner.

SEND UP LOWER YARDS.

The foot-ropes, stirrups, flemish-horses, reefing jackstays, and the necessary bands and bolts, are fitted to the yards before leaving the loft. The yards are placed, like the topsail yards, abreast their respective masts, with the port yard-arms towards the ship, trusses aft.

Lash the lower block of the *topmast head tackle* firmly

to the slings of the yard, keeping the sling bolt clear. Unhook the top burtons from the topsail yard, and hook them to their respective straps, on each side of the lower yard ; if a heavy yard, hook the lower pendant tackles (which are hooked to the forward legs of the pendants) to strong straps, which are passed around each quarter of the yard. Have a strong *shore guy* on the dock, and for a forward guy, have a good tackle, one block of which is hooked to the centre of the yard, the other being hooked to a strap at the bowsprit cap.

Single and overhaul the lower lifts, and hook them to the lift bolts on the yard arms. Now man the mast-head tackle, top burtons, pendant tackles, and have hands to take in the slack of the lifts. Have the shore and forward guys set taut and well tended.

WALK AWAY! and sway the yard up and inboard, resting it across the rail upon skids or chocks (that have been placed there to receive it). Hook the brace blocks with braces rove off. (If the braces are hooked on the dock there is no necessity to land the yard on the rail.) Man all the gear, tend well the forward guy, keeping a strain on it to guy the truss clear of the mast.

SWAY ALOFT! being careful to keep an even strain on all the gear as the yard goes up. When high enough, hook or shackle the slings, place the navel bolt, slacking the forward guy to assist in bolting the truss, double the lifts, come up all the gear and square the yard.

The main and cross-jack yards are sent up in the same manner ; it is seldom necessary to use the pendant tackles for the cross-jack yards, and with cross-jack braces rove off they will take the place of a fore-and-aft tackle.

Lower yards are usually sent aloft by jeer falls, rove

through large treble blocks called jeers, the upper blocks being secured to the mast-head by lashings or a shackle, the lower block being lashed to the slings of the yard. In some modern ships the jeers are of iron, and are permanently placed to form a part of *the slings* of the lower yard, the blocks taking the place of a few links of the chain.

For expedition, however, in getting on board and sending up topsail and lower yards, spare boats or any heavy weights, that it may be necessary to handle with a long purchase; the *topmast head tackle* is preferred by riggers. The longer the purchase the greater the drift either forward, aft, outboard or inboard, and consequently the easier to handle, and the quicker the work is accomplished. The ship can be rigged and dismantled with this purchase.

TO SEND UP TOPGALLANT-MASTS.

The Fore.

Whip or pass the topgallant masts on board, place them abreast of their respective masts, heel aft, after side up, the fore and mizzen topgallant-masts on the starboard side, the main on the port side of the lower masts; hook the topgallant top blocks, aloft, to the eye-bolt under the topmast cap, (the fore and mizzen on the *port* side of the cap, the main on the *starboard* side); reeve the mast rope through the top-gallant top block, from aft forward, down through the hole in the cross-trees and through a lizard, which is to be made fast at the royal-mast-head, then through the sheave near the heel of the topgallant-mast from *port* to *starboard*, back aloft, through the square hole in the cross-trees, and clinch it to the eye-bolt in the under side of the cap, opposite to the topgallant top block; stop the hauling part of the mast-rope to the hounds of the royal-

mast *until the mast is swayed up and down*; send the hauling part down abaft everything. When all ready, man the mast rope, SWAY UP AND DOWN! (man on lower yard cut the stop at the hounds of the royal-mast). SWAY ALOFT! and point the mast through the hole in the cross-trees, cast off the lizard, and clamp the forward side of the trestle-trees as soon as the heel of the mast is clear of the topsail yard; proceed to

SEND UP THE TOPGALLANT RIGGING.

It goes over the funnel as follows: First, the foretopgallant and flying-jib stay; second, the shrouds; third and last, the back-stays. The rigging is all fitted in the loft, placed upon the topgallant-funnel in regular order and seized there.

Overhaul both girtlines down abaft (the blocks of which are hooked to the after eye-bolts of the topmast cap.) Bend one girtline around *all parts* of the rigging, about four feet below the funnel, and stop it *to the funnel* with a good stop; bend the other girtline around *all parts* of the rigging, about one-fourth of the distance between the funnel and the ends of the shrouds; this is to assist in "*lighting up*" the rigging as it goes aloft. When ready, SWAY ALOFT! and when *high enough*, the man at the mast-head cuts the funnel stop and places the funnel on the topmast cap, fair over the round hole of the cap, ready for the topgallant-mast; if necessary lash it there; cast off the girtlines, take the backstays into the chains and reeve the laniards; reeve the topgallant-stay, and send the flying-jib-stay forward, ready for reeving; reeve the topgallant shrouds through the horns of the cross-trees, between the topmast shrouds, *over* the futtock staffs down into the top.

Overhaul the girtlines down abaft again. The royal rigging has been hooked or seized to the band that goes over the hounds of the royal-mast, before it leaves the rigging loft; bend on the girtlines abaft in the same manner as described for the topgallant rigging, SWAY ALOFT! and place the band *fair* over the funnel ready for the royal-mast; above all, place the truck with signal halliards rove off, spindle and lightning conductor attached. Take the royal-shrouds through the holes in the arms of the jack, to the top; the back-stays to the chains, and the royal-stay forward ready for reeving.

Now man the topgallant-mast rope (cast off the funnel lashing, if lashed) SWAY UP! and fid. The truck goes on the head of the mast, the band takes at the hounds of the royal-mast, and the funnel takes at the hounds of the topgallant-mast; spread the rigging as the mast goes aloft and see the band and funnel fair and square on the mast.

The main and mizzen topgallant-masts are sent aloft in the same manner.

RIG OUT THE FLYING-JIB-BOOM.

Whip or pass the flying-jib-boom on board, point it outside of the stays and on the starboard side of the jib-boom, passing it through the bight of a rope which is taken around the jib-boom and topmast-stays; lash a block to the shackle on the starboard side, of the end, of the jib-boom, reeve the heel-rope through this block, then through the sheave in the heel of the boom, from *starboard to port* and hitch the standing part, to the shackle, on the opposite side of the jib-boom; MAN THE HEEL ROPE! haul out! point the end through the flying-jib-wythe, and a few feet beyond, place the iron band for the guys and martingales, passing the

bull's eye straps (that the guys reeve through) over the whisker-boom ends; (if not already done); bear the boom in its place and clamp it; set up the martingale guys and stays, then topgallant and royal-rigging. All stays reeving through bees or sheaves have their hearts or dead-eyes turned, in after being rove.

CROSS TOPGALLANT YARDS.

The topgallant yards are whipped or passed on board, having been rigged in the loft; and are placed in the lower rigging, the fore and mizzen on the port side, the main on the starboard side.

The light yards are secured forward of the forward swifter of the lower rigging, the lower yard-arms resting in a hanging eye, called a stirrup, made fast outside in the chains; the upper yard-arms being secured with a good lashing around the yard-arm and swifter.

The topgallant-yard-rope with sister-hooks in the end, and lizard attached, is rove through a good-sized grommet, then from forward aft through the sheave in the topgallant-mast (or the jack-block) down *abaft all* on deck. The sister-hooks are hooked to the slings of the yard, and the lizard is rove through the eye or thimble of the quarter-strap on the upper yard-arm, and made fast with a slippery hitch to the quarter-strap on the opposite side; the grommet is slipped over the upper yard-arm, and the tripping line stopped to the slings. When all ready, man the topgallant-yard-rope; SWAY OUT OF THE CHAINS! The lashing which secures the yard in the rigging is eased off, and the yard is swayed up and down the lower mast, the upper yard-arm clear of the lower yard. In the mean time, the lifts and braces have been let go and well overhauled, then taken into the topmast cross-trees ready for the yards. When all

ready, SWAY ALOFT! When high enough (the upper yard-arm at the cross-trees,) *slip off the grommet* and put on the *upper* lift and brace *over the snorter*, keeping *the lift in line with the iron jack-stay*, and the brace leading fair aft.

NOW SWAY HIGHER! high enough when the slings of the yard are well above the topmast cap, and the thimble of lizard near the topgallant sheave hole; put on the lower lift and brace over the snorter, and take down the slack of the lower lift in the top. See the lizard all clear for slipping, the parrel ready for passing. *Keep the yard up and down the mast*, by hauling in on the lower foot rope. When all ready, TEND THE LIFTS AND BRACES! SWAY ACROSS! Cast off the lizard, slack down the yard rope until the yard is well down on the cap, pass the parrel lashing, and square the yard.

The main and mizzen are sent aloft in the same manner.

CROSS ROYAL YARDS.

The yards are whipped on board, and placed in the lower rigging; the fore and mizzen in the *starboard*, and the main in the *port* rigging.

The foot ropes, iron bands, slings, quarter blocks, etc., etc., are fitted at the loft.

Send up and cross royal yards in the same manner precisely, as the topgallant yards were crossed, except that the lifts and braces are taken in to the "*jack*" before placing them over the yard arms.

CHAPTER XI.

STAYING OF MASTS, AND SETTING UP RIGGING.

What is the general custom of staying masts?

The foremast is stayed plumb, or straight up and down; the mainmast with a slight rake aft; and the mizzen mast a little more raking aft than the main.

STAYING A MAST BY THE USE OF BATTENS.

Conjointly with marks on the deck and masts, battens are used in setting up rigging, to show whether the mast requires going to starboard or to port, forward or aft. To cut them, in the first instance, draw a line from the centre of the mast-hole across the deck, measure off two equal distances on each side of the mast, and mark the extremities. Take two long battens of equal length, place one end of each on the marks on each side of the deck, and rest the other ends against the mast. Pull the rigging up on either side, till the two ends come abreast of each other, and the mast must necessarily be upright. Drive a nail on each side of the mast and deck for permanent marks; but one batten only need now be retained.

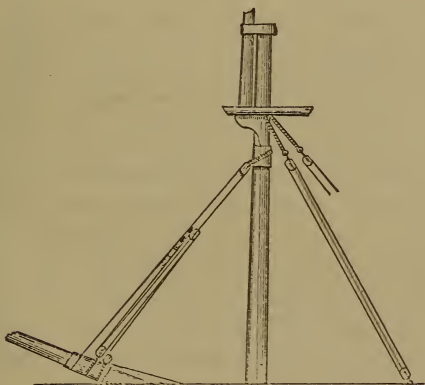
The rake being determined, say half an inch to a foot, a plumb-line is dropped from the centre of the mast, from any distance up, and the mast raked till a corresponding distance is plumbed. If, for instance, the plumb-line is dropped from the trestle-trees at sixty feet, the line must plumb at thirty inches abaft the mast.

The rake of the masts has reference to the keel; but, as the deck and the keel are not parallel, the angle between

their planes must be considered, when determining the angle the batten should have to the deck in order that it may have the assigned angle to the keel.

Draw a fore-and-aft line from the centre of the mast, place the end of the batten on it, either before or abaft the mast as most convenient; mark where the ends take the mast and deck, with a couple of nails, which, with the side marks and this batten, are for future guidance, it being needed merely to place the batten afterwards against the mast, to show how the latter requires to be moved.

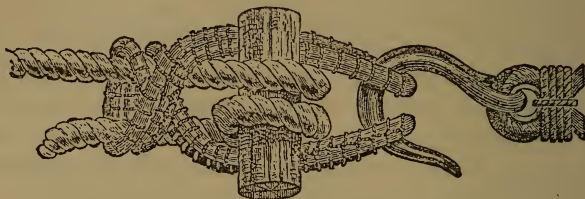
STAYING LOWER MASTS.



Staying "Lower mast."

The bowsprit having been secured, the shrouds and bobstays set up, the gammoning set up with nut and screw, the foremast is then stayed. It is first got into position by hooking two pendant tackles to the forward legs of the mast-head pendants, leading them aft, setting taut and belaying; this is called "*backing the lower pendants;*" then

a runner and tackle is made fast below the mast-head, led forward to the bowsprit, and set taut until the mast stands according to the draft.



“Strap and toggle, for laniards.”

How do you set up fore-stays ?

Let the collars of the stays down snugly over the eyes of the lower rigging. At the distance of eight or ten feet up the stays, from the upper heart, place canvas to protect them from chafe, and hook the upper-block of a stay-luff to a strap over this canvas. Take a round turn in the end of the laniards of the stays, and through this turn, place a toggle, and clap a strap around both parts of the laniard (place canvas to protect the laniard) below the toggle. To this strap hook the lower block of the luff-tackles, and take the end of the hauling part of these tackles, with a blackwall hitch, to the lower block of the mast-head pendant-tackles (which are hooked to straps around the lower mast-head, to be in line with the stays). Set up both stays together, and then bind the parts of the laniards, temporarily, by clapping on a stout racking seizing to keep them from slipping.

How are the ends of laniards (for hearts) finally secured ?

When all ready, fill up the swallow of the heart by expending the laniard—the ends being taken and tucked down, along and between the other parts of the laniards, and well secured with neat marline seizings. By this method,

the laniards look uniform or alike, and present a neat, snug appearance.

The main and mizzen stays are set up in a similar manner.

How do you set up lower rigging?

Place canvas on the shrouds about half-way up, to avoid chafe, and tail the blocks of the luffs over it. Take a round turn in the bight of the laniards, and to straps around a toggle thrust through (place canvas to protect laniards) hook the other blocks, and lead the falls up to the pendant-tackles as in Fig. Set up all the shrouds in this manner, *a pair on each side at a time*. Commence with the forward shrouds to set up. After setting up, temporarily, get a pull, *together*, of the forward and after shroud, *on each side*, and secure them; then take in the slack of all the other shrouds and set up for a full due.

How are the ends of the laniards secured?

As fast as each pair of shrouds is set up, secure the laniards, temporarily, by clapping on a stout racking seizing, binding the parts of the laniards. To secure for a "full due," take a neat hitch, called a "*laniard hitch*," above the upper dead-eye, and secure the ends of laniards in exactly the same manner as the laniards of the lower stays were secured.

What is done after the shrouds are set up, and before the laniards are secured or hitched for "full due?"



"Setting up lower rigging."

The sheer-poles are seized on with a cross-seizing, to keep the dead-eyes in line, a piece of leather or parcelling being placed underneath the sheer-pole, at each shroud, to prevent chafe; preparations are then made to rattle down.

When are the masts wedged and the mast-coats put on?

As soon as the masts are properly stayed. Mast-coats are made of No. 1 and No. 2 canvas.

Never wedge a mast for full due, until the rigging is well set up, and the mast properly stayed.

What is capping the rigging?

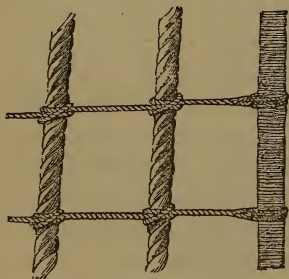
Covering the ends of the standing rigging with tarred canvas, to protect them from the weather.

What preparations are necessary for rattling down?

The rigging is swiftered in and sparred down. The tar and tallow (slush) is put in small pots, convenient for work, the marline-spikes at hand, the ratline stuff well stretched, the turns all taken out, and the stuff brought up in coils and placed under the rigging that is to be rattled down.

What is "swiftering in?"

Passing small-sized rope around the shrouds, at intervals, in order that they may not get out of line when the ratlines are hove taut.



"Ratlines."

What is "sparring down?"

Lashing small spars or oars in the rigging, four or five feet apart, for men to stand on when rattling down; it will prevent the spread of the rigging. The forward ends of the oars or spars must be even or square.

What is "rattling down"?

Hitching and seizing the ratlines in their proper places (parallel to the sheer-pole) on the shrouds.

Where do you commence seizing when rattling down the starboard rigging?

The first two or three ratlines above the sheer-pole are made of rod-iron, and are parallel to the sheer-pole; they should be served over like the sheer-pole, to prevent rust and to appear like the rest of the ratlines. These will not get out of shape, when the rigging is manned, before laying aloft. Commence seizing, next above the iron ratlines on the *forward* shroud, (for starboard rigging) in order that the ratlines may be square with the sheer-pole, and to save waste of material.

Describe rattling down the starboard rigging?

Commence at the after shroud with a small coil of ratline stuff, in the right hand, about the length you will require for hitches, and form slack clove-hitches on each shroud until you reach the forward shroud; then splice an eye in the end of the ratline stuff, and seize this eye to the forward shroud, fourteen inches above the upper iron ratline. This eye seizing must be passed, so the eye will lie flat (in a horizontal plane) showing only one part of the rope. Now commence and work aft, heaving well taut each clove-hitch, in succession, from forward aft, and keeping them square with the forward eye; tarring the shrouds under the hitches, and knocking the parts of the hitches together, so as to make a neat job. Never knock the hitch *up*, but always knock *down*; in that way you tauten the rattline. When you come to the after shroud *cut* the stuff, leaving sufficient end, and splice an eye; seize this eye to the after shroud, in the same manner as the forward eye is seized. In this way you have been able to *cut* without waste of material; and you are

now ready with the end for the next ratline. If on the port side, work in the opposite way, that is, commence hitching from *forward*, and make the first eye-seizing on the *after* shroud. Two men, one in the starboard and one in the port rigging, can work from the same coil, each taking an end.

How do you tell the distance between the ratlines?

A measuring rod is used, which is of the proper length, fourteen inches.

How are the foretopmast-stays set up?

The top burtons are overhauled down, each burton being hooked into its own pendant, and then hooked into a strap on the bowsprit, in a line with the stays. Set taut on both burtons until the mast is far enough forward. About ten feet up, have canvas on the stay to protect it from chafe; then set up both stays at once, with luff-tackles clapped on the stays, and to ends of the laniards. Secure the laniards the same way as described for the lower stays.

The maintopmast-stay is set up in the same manner, except that the maintop-burtons are brought to the foot of the foremast and set taut, and the luff-tackles are, up and down, on the main topmast-stays *abaft* the foremast. The laniards are secured as before.

The mizzen topmast-stay can be set up with the luffs on the stay, and without the aid of top-burtons, the mast being lighter and the stay single.

How do you set up topmast rigging?

The runner (which has a thimble in one end) being rove through a single block, hooked, to a cat's paw, on the laniard, is tailed on to the shroud-leg about six or eight feet above, and the lower block of the top-burton then hooked to the thimble. Before hitching the laniard, seize on the

sheer-poles and futtock-staffs—the latter *inside* of the topmast-shrouds—under the eyes of the rigging, and swifter in. Seize the forward cat-harpen legs (on each side) to the forward shrouds, and the after ones (around the mast) to the after shrouds, then spar and rattle down.

How is topgallant rigging set up?

By using lift-jiggers or the topgallant purchase in the tops. The royal rigging is set up in the same manner.

How are topmast-backstays set up?

In the same manner as the lower rigging, the backstays on each side being set up at the same time.

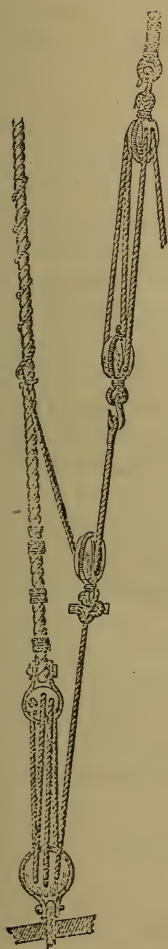
How are topgallant and royal-backstays set up?

In the same manner as topmast-backstays, setting up both sides together, care being taken not to get the masts out of line.

What is snaking down?

Passing a small rope (with turns) in a zigzag direction between two larger ropes.

Rigging should never be set up unless the boatswain, or one of his mates, is looking out to keep the masts in line; particularly when the backstays and fore-and-aft stays are being set up.



"Setting up topmast rigging."



"Snaking down."

CHAPTER XII.

RUNNING RIGGING.

An apprentice, in learning the running rigging of a vessel, should inform himself regarding the following points: First, *what is the object of the rope?* Second, *where does it belay?* And third, *to reeve it.* So that, if an order should be given to “*Man the royal clewlines!*” he will understand at once that the royals are to come in (for the clewlines haul the clews of the sail up to the quarters of the yard). And he should be so well acquainted with the lead, and belaying, of the gear, that he will be able to jump and man, not only the royal-clewlines, but any rope, without a moment’s hesitation, *day or night.* Therefore, learn at once *the use of a rope, then where it belays,* and afterwards to reeve it.

The following methods of reeving running rigging are those in general use in the navy. There are, of course, different ways of reeving gear, but in describing the following, the object has been to observe the common usage,—and to lead the gear fair, without chafe, and to get a good purchase.

Only general ideas can be gained from a description. The better way is to go on deck and follow each piece of gear (with the eye), from one end to the other. In that way it will become impressed upon the mind, and not easily forgotten.

THE USES OF THE DIFFERENT ROPES.

What are halliards used for?

To hoist a sail on the mast or stay.

What are sheets used for?

To spread the foot of a sail.

What are tacks used for?

To haul forward the clew of a course, and haul out the outer clew of topgallant and topmast studding sails. Courses have a tack and sheet shackled to each clew; the tack is always used on the weather side, the sheet on the lee side.

What are braces used for?

To swing the yards around, horizontally, into such a position that the wind will strike the sails properly. Braces are led (if possible) from the yard-arms aft and *downward*, because, the square sails being secured at the two bottom corners to the yard immediately below them, the wind blowing on the sails will bring a strain on the yard-arms, blowing them forward and upward.

What are lifts used for?

To support the yard-arms and keep them from drooping.

What are clew-lines used for?

To haul the clews of a topsail, topgallant-sail, or royal, up to the quarters of their respective yards. They are abaft the sail.

What are clew-jiggers used for?

To haul the clews of a topsail or course, forward of, and above, the yards. They are forward of the sail, and only used for convenience in furling.

What are clew-garnets used for?

When taking in a course, to haul each clew up to the quarter of its respective yard. Used only on courses.

What are bunt-lines used for?

When taking in square sails (except royals and studding sails) they are used to haul the foot of the sail up to, or a little above the yards. Buntlines are forward of a sail.

What are leech-lines used for?

When taking in a course, leech-lines are used to haul the leeches of the sail up to the yard, on the forward side.

What are bunt-jiggers or bunt-whips used for?

To haul up the bunt of a sail when furling.

What are reef-tackles used for?

To haul the leeches of a sail chock up to the yard-arms, to assist the men in reefing. Reef-tackles are also used to stretch the head of a sail taut along the yard, when bending.

What are bowlines used for?

After a sail is hoisted, and the yards braced up, the bowlines are used to haul and steady a weather-leech further forward, to make it catch the wind better.

What are brails used for?

When taking in a trysail or spanker. They lead from the after leech of a sail, up to the gaff and mast on both sides.

What are vangs used for?

For steadying the gaff, when the sail is brailed up.

What are downhauls used for?

For hauling down the heads of fore-and-aft sails.

What are outhauls used for?

To haul a spanker out to the end of its boom, and a trysail and spanker out to the ends of their gaffs, or a lower studding sail out to its boom.

REEVING THE GEAR.

Running rigging on the bowsprit.

In reeving the running rigging, it is rove as it would be starting with the end of a rope, from the coil.

Where do the foretopmast stay-sail halliards belay?

At the after part of the *fore-pin rail*, *port side*. They lead aft.

Reeve them ?

They consist of a whip and runner. A block is spliced in one end of the runner, the other end of which is rove through a hanging block on the after end of the port foretopmast trestle-trees, then to another hanging block on the forward end of the port foretopmast trestle-trees, down the *port fore topmast stay*, and is hooked to the foretopmast stay-sail with sister-hooks. The whip is rove up through the single block which is spliced to the runner, and the standing part is secured at the *port fore-pin rail*.

Where does the foretopmast stay-sail downhaul belay ?

At the forecastle or head-pin rail, on the port side. It leads aft.

Reeve it ?

It is rove through a leader at the forecastle pin rail, then up through a block made fast near the tack of the staysail (at the foot of the stay) and is clinched to the head of the sail.

Where do the foretopmast stay-sail sheets belay ?

There are two sheets, and they belay, one on each side of the forecastle, near the bulwarks, and forward of the fore-rigging.

Reeve them ?

They consist of whips and pendants. Each pendant is made fast to the clew of the sail, and has a block turned in the other end, which forms the outer block of the whip; the inner block of the whip hooks to an eye-bolt on the forecastle, the standing part of the whip is made fast to the outer block.

Describe the centipede on the jib-boom ?

A strong piece of rope, one end of which is secured at the head of the jib-boom, and the other at the bowsprit cap.

Through the strands, at intervals of four feet, small pieces of rope are placed; these small ropes are called centipede legs, and are used to bind the sail down to the jib-boom and make a neat stow of it.

Where do the jib halliards belay?

At the after part of the fore-pin rail, starboard side. They lead aft.

Reeve them?

They reeve up through a hanging gin-block on the after part of the starboard foretopmast trestle-trees, then through a hanging gin-block on the forward part of the starboard foretopmast trestle-trees, down through a block at the head of the sail, back up the stay, and the standing part is hitched and seized to the collar of the jib and foretopmast stays.

Where does the jib-downhaul belay?

On the starboard side of the *forecastle* pin-rail. It leads aft.

Reeve it?

It is rove through a leader on the starboard side of the forecastle pin-rail, to a block secured near the foot of the stay, and the standing part is rove through a few hanks and clinched to the head of the sail.

Where do the jib-sheets belay?

At the forward end of the fore pin-rail, (both sides.)*

Reeve them?

They are double, fitted with whips and pendants, in the same manner as the foretopmast-staysail. The whip reeves the same, and the standing part of the whip makes fast in the same way to the outer block, at the end of the pendant.

Describe the centipede on the flying-jib-boom?

It is for the same purpose, and fitted in the same manner as the jib centipede.

* In heavy weather they belay to the cleats on the deck or water-ways, just forward of the fore rigging.

Where do the flying-jib halliards belay?

At the after part of the fore pin-rail, *port side*. They lead aft.

Reeve them?

They are single. Reeve up through a gin-block secured on the port side of the jack, down the flying-jib stay, and the standing part hooks to the head of the sail with sister-hooks.

Where does the flying-jib downhaul belay?

At the forecandle pin-rail—port side.

Reeve it?

It reeves through a leader in the forecandle pin-rail, out through a block at the foot of the stay (or at the end of the flying-jib-boom) and the standing part is clinched to the head of the sail.

Where do the flying-jib sheets belay?

At the cavil in the forward part of the fore pin-rail, both sides.

Reeve them?

They are double, but have single whips; the standing part is hooked to a bolt on the side of the forecandle, and reeves through a block in the end of the pendant.

Jib and flying-jib sheets are generally led, through leaders, on the forecandle.

RUNNING RIGGING ON FOREMAST AND YARDS.

Where do the fore braces belay?

At the main fife rail. They lead forward in each gangway: (sometimes they lead aft.)

Reeve them?

They lead through the sheaves in the main fife-rail (from forward aft) up to blocks on main bibbs, forward

to the brace blocks on the yard-arms (from down up), back, and the standing parts are hooked to bolts on the side of the main bibbs.

Where do the fore tacks belay?

On each side of the fore-castle, to cavils or cleats on the spircketting near the bulwarks, just forward of the fore pin-rail; in heavy weather they belay to the bitts.

Reeve them?

They reeve through chocks in the bulwarks out to large single blocks, on the fore bumpkins, up through tack-blocks shackled to the spectacles of the sail, back, and the standing parts are hooked to the ends of the fore bumpkins; both *fore and main tacks* are wormed and served two or three fathoms from the end, as a protection from wet, chafe, etc.

The hooks for tacks, sheets, halliards and all running gear having hooks, etc. spliced to the standing part, are spliced on *after* the rope is rove off.

Where do the fore sheets belay?

To cleats just abaft the fore pin-rails, both sides. They lead forward.

Reeve them?

They reeve through the bulwarks sheaves, thence through sheet-blocks shackled to the clews of the sails, back to the bulwarks, and the standing parts are hooked with sister-hooks to eye-bolts, that are just abaft and below the bulwark sheaves for the hauling parts.

Where do the fore and main clew-garnets belay?

To their respective fife-rails, both sides. They lead aft.

Reeve the fore?

They are rove through the leaders at the fore fife-rail, up through the quarter blocks on the fore yard, then down through blocks at the clews of the sail, back to the quarters

of the yard, where the standing part is taken *around* the yard, outside the quarter block, and secured to its own part. The main are rove in the same manner. Substitute *main* for *fore*.

Where does the fore bowline belay?

To the forecastle pin-rail. It leads aft.

Reeve it?

It reeves through a block on the fore stay; then, through the bull's eyes on the bowline bridle, forward again, and the standing part is seized to a bridle on the fore stay.

Where do the fore and main reef-tackles belay?

They are belayed to their respective pin-rails, both sides, (fore and main clew-jiggers are used for whips.)

Reeve the fore?

They are fitted as pendants. A thimble is turned in one end, the other ends are rove down through blocks on the fore yard-arms, and hook to the reef-tackle cringle in the leeches of the sail. The fore clew-jiggers are used for the whips, the lower block of which hooks to the thimbles in the upper ends of the reef-pendants. The main are rove the same. Substitute *main* for *fore*.

Where do the fore buntlines belay?

Usually at the forecastle pin-rail (on both sides.) They lead aft.

Reeve them?

The upper and outer legs toggle to the outer buntline toggles on the foot of the sail, then up to the blocks under the forward part of the fore top, down through the upper sheaves of the fiddle-blocks, back to the blocks under the top, and down to the inner buntline toggle on the sail. The lower legs reeve through the leaders in the forecastle pin-rail, to blocks on the bowsprit, up to the lower sheaves of the fiddle-

blocks, and the standing part is seized to the fore stay. In steamers they are up and down the mast, which is neater and better.

Where do the fore and main leech-lines belay?

At the forward part of their respective pin-rails, both sides.

Reeve the fore?

There are two of them, the inner and outer leech-line; they reeve up through fairleaders on the lower rigging and double blocks under the top, to single blocks seized to the jackstay on the quarters of the yard, down, and are clinched to the leeches of the sail. The main are rove the same. Substitute *main* for *fore*.

Where do the fore and main clew-jiggers belay?

At their respective pin-rails, both sides.

Reeve the fore?

They lead up through fairleaders in the fore rigging, to blocks hooked under the top, then down to blocks in the clews of the sail, back again, and the standing part is made fast to the upper block. The main are rove the same. Substitute *main* for *fore* (generally unhooked at sea.)

Where do the fore and main bunt whips belay?

At the starboard forward side of their respective firerails.

Reeve the fore?

It leads through a block seized to the upper part of the lower slings, down forward of the sail, and hooks to the upper glut *abaft* the sail, (it is usually unhooked at sea.) The main reeves the same. Substitute *main* for *fore*.

Where do the foretop-mast studding-sail-boom tricing lines belay?

At the fore pin-rail, each side.

Reeve them?

They lead up through a fair-leader on the fore shrouds through a single block hooked under the forward part of the top, then to a single block hooked to the becket on the heel of the boom, the standing part being made fast to a becket in the bottom of the upper block.

Where do the fore and main topsail halliards belay?

At the after part of their respective pin-rails, both sides.

Reeve the topsail tyes?

They are of wire rope, the lower end, of each, has a thimble turned in for the fly-block to hook to, the other end of the tyes passes up through gin-blocks *under the topmast trestle-trees*, down through tye-blocks on the slings of the yard, then up through the topmast trestle-trees, and the standing parts are clinched around the topmast-heads. The heel of the topgallant-mast is scored out on purpose to admit the tye. The tyes of fore and main topsail-yards are double. In small vessels the topsail-tyes reeve through a sheave in the topmast-head, in which case they are, of course, single.

Reeve the foretopsail halliards?

There are two double blocks. The blocks which are hooked into the thimble in the ends of the topsail tyes, are the fly-blocks. The falls are rove up through the fly-blocks, down and through a block in the after part of the fore chains (both sides), up again to the fly-block, down to the chains, the standing part being finally made fast to the fly-block. The main are rove the same. Substitute *main* for *fore*.

Fly-blocks travel up and down on a jackstay or traveller.

"*Bell's purchase*" is now being used in small vessels.

Explain Bell's Purchase.

This purchase consists of four single blocks, one of which, the tie-block, is shackled to the tie at the mast-head, and two blocks, one on each side, are hooked to bolts in each of the chains; another, the *fly* or whip-block, hangs just below the tie-block, and the standing part of the purchase being hooked to this fly or whip-block, the bight is seized at a proper distance to the tie-block, from thence reeve down through the block in starboard chains, up through the tie-block down through block in port chains, up through fly or whip-block, and thence to deck. The topsail tie reeves through a sheave in the head of the topmast, and secures to the yard.

Where do the foretopsail braces belay?

At the main fife-rail, both sides. They lead aft on the quarter deck. Sometimes they lead forward in the gangway.

Reeve them?

They reeve through the sheaves in the main fife-rail from *aft forward* up to blocks on the main bibbs out to clump-blocks seized to the collar of the main stay (to prevent chafe from the foot of the main topsail), then forward to the brace blocks at the foretopsail yard-arms from down up, then aft, and the standing parts are hitched or seized together above the eyes of the main topmast rigging and are then stopped down the collar of the stays on each side as far as the crotch (so as to avoid chafe from the foot of the topgallant sail.)

Where do the fore, main and mizzen topsail sheets belay?

At the topsail sheet bitts, forward of, and on each side of their respective masts.

Reeve the fore?

They are rove through the sheaves in the foretopsail sheet

bitts, up through the quarter blocks under the fore yard, along the yard and through the sheave in the yard-arm from down up, then through the blocks which are hooked or shackled to the clews of the topsail, back to the yard-arms, where the standing parts are secured around the yard-arms with an inside clinch. The main or mizzen topsail sheets are rove the same, only substitute *main* and *mizzen* for *fore*.

Where are the rolling tackles belayed?

To the fore and main fife-rails on both sides.

Reeve them for the lower yards?

With patent trusses rolling tackles are not used except in heavy weather; the pendant tackles or stay luffs are generally used, and the upper block is hooked well out on the quarter of the yard, the lower block being hooked to a heavy strap around the mast, as near as possible in a line with the yard, then a leader for the fall is used, and the whole belayed at the fife-rail.

Where do the fore, main and mizzen topsail clewlines belay?

At their respective fife-rails, both sides, the mizzen at the mizzen mast.

Reeve the fore?

They consist of whips and runners. The runners have a single block in one end, the other ends are rove through the *forward* sheaves of the quarter blocks down and hook to the clews of the sail. The whips are rove up through the lubber's hole and through the blocks in the end of the runner, then down again, and the standing part is made fast to a bolt under the fore fife-rail. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the foretop-bowlines belay?

At the forecastle pin-rail, both sides.

Reeve them?

They reeve through leaders in the fore-castle pin-rail, then to blocks hooked to the bees of the bowsprit, then up and are toggled to the bowline bridles on the leeches of the fore-topsail.

Where do the fore, main and mizzen topsail buntlines belay?
At their respective pin-rails, both sides.

Reeve the fore?

They reeve through fair-leaders on the fore rigging, up through the lubber's hole to gin-blocks that are hooked under the foretopmast trestle-trees, then down and are toggled to the proper toggles on the foot of the foretopmast. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen topsail reef tackles belay?

The fore at the fore fife-rail, both sides; the main at the main fife-rail, both sides; the mizzen at the mizzen pin-rail, both sides.

Reeve the fore?

They are sometimes rove through the lubber's hole to a sheave in the sister-blocks (that are seized to the topmast rigging); but a better way is to reeve them to blocks hooked to the topmast cap plate, and thus have no strain on topmast rigging; they then reeve down through the outer sheaves in the topsail yard-arms, through single secret blocks at the reef tackle cringles, and the standing parts are clinched over the pacific-irons at the yard-arms. In reefing the top-sails, when topsail reef tackles are rove in this way, if the halliards are let go and the reef tackles fast, the leeches of the sail will come right out to the yard-arms. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main, and mizzen topsail clew-jiggers belay?

At their respective pin-rails, both sides.

Reeve the fore?

They are rove up through fair-leaders and the lubber's hole to blocks (fitted with short pendants), hooked under the fore topmast trestle-trees, then down forward of the sail to blocks (also fitted with short pendants), that are hooked to the clews of the fore topsail, back again, and the standing parts are made fast to the blocks at the trestle-trees. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*, (generally unhooked at sea.)

Where do the fore, main, and mizzen topsail bunt-whips belay?

The fore at the fore pin-rail, port side; the main at the main pin-rail, starboard side; the mizzen at the mizzen pin-rail, port side.

Reeve the fore?

Through a fair-leader on the port fore rigging, up through the lubber's hole, to a gin block hooked under the forward part of the fore topmast trestle-trees, then down forward of the sail (under the foot) up abaft the sail, and the standing part hooks into the upper glut. Bunt-whips are kept hooked in port only. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore topgallant studding-sail-boom-tricing lines belay?

In the foretop, to cleats on the fore topmast shrouds.

Reeve them?

They are single and reeve through a single block seized to the forward shroud of the fore topmast rigging (well up), thence to a becket in the heel of the boom.

Where do the fore topgallant braces belay ?

At the main fife-rail (both sides). They lead forward.

Reeve the fore ?

They are single, and reeve through fair-leaders in the main fife-rail, up through the lubber's hole to blocks seized on the forward shroud (close under the eyes) of the topmast rigging ; then through check blocks seized to the collar of the main topmast stay, forward, and the standing parts go over the fore topgallant yard arms with an eye, which is marled to the lift. In large vessels, whips are attached to the ends of the braces just under the maintop. Sometimes iron spectacles are fitted to go over the yard arms, and the lift and brace are seized or spliced to the eye ; this is neat and secure.

Where do the fore, main and mizzen topgallant yard ropes belay ?

The fore at the after part of the port fore pin-rail ; the main at the after part of the starboard main pin-rail ; the mizzen at the port mizzen pin-rail. At sea topgallant yard ropes are kept neatly coiled in the tops. Frequently short yard ropes are used at sea, being rove in place of the long ones. Short yard ropes have thimbles in the ends, for the halliards to hook to, and are called top gallant tyes.

Reeve the fore ?

It is taken up abaft everything, through the sheave in the fore topgallant mast (just under the eyes of the rigging), down forward of the mast, and the standing part hooks with sister hooks to the fore topgallant yard. The main and mizzen are rove in the same way. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen topgallant halliards belay ?

The fore at the port side of the fore fife-rail, they lead aft; the main at the starboard side of the main fife-rail, also lead aft; the mizzen at the port side, after part, of port pin-rail.

Reeve the Fore?

The upper blocks of the fore topgallant halliards are tailed or hooked to the topgallant yard rope, just below the eyes of the topmast rigging; the lower block is hooked to an eye bolt in the upper part of the port lower trestle-trees. The fall is taken up through the port side of the lubber's hole, through the block tailed or hooked on to the yard rope, down to the block in the trestle-trees, up to the block on the yard rope, and so on; the standing part made fast to the block at the trestle-tree. The main and mizzen reeve the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen topgallant sheets belay?

The fore at the fore fife-rail, they lead aft; the main at the main fife-rail, they lead aft; the mizzen belay at the mizzen mast, both sides.

Reeve the fore?

They are single and reeve through the leaders in the fore fife-rail, up through the lubber's hole to the after sheaves of the quarter blocks under the topsail yard, along the yard and up through the inner sheaves in the topsail yard arms, the standing parts hook, with sister hooks, to the clew iron in the clews of the topgallant sail. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen topgallant clewlines belay?

At the pin-rails on both sides of the fore, main and mizzen masts, respectively.

Reeve the fore ?

They lead up through fair-leaders on the fore rigging, through the lubber's hole to the forward sheave of the quarter blocks under the topgallant yard, and hook to the clew irons of the topgallant sails with sister hooks. In the larger vessels they are fitted double, with sail blocks at the clews, the standing part being secured to the quarter blocks on the yard. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen topgallant buntlines belay ?

At their respective pin-rails, (both sides).

Reeve the fore ?

They reeve through fair-leaders on fore rigging, up through the lubber's hole to gin blocks hooked to the inner arms of the jack; the standing parts make fast to the toggles in the sail, with two legs on each buntline, one leg toggled to the leech, the other to the foot of the sail. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

In small vessels the mizzen is sometimes single.

Where do the fore, main and mizzen topgallant bunt-whips belay ?

To the starboard fore, port main and starboard mizzen pin-rails, respectively.

Reeve the fore ?

It reeves through fair-leaders on the starboard fore rigging, through the lubber's hole to a gin block hooked under the jack, thence down forward, and up abaft, to the glut on the after part of the sail. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore royal braces belay ?

At the main fife-rail, (both sides) they lead forward.

Reeve them?

They reeve through leaders in the main fife-rail, through the lubber's hole, to gin blocks hooked to the funnel, or seized to the topgallant rigging (under the eyes), and sometimes through blocks seized to the collar of the main topgallant stay, the standing parts go over the fore royal yard arms, with an eye (which is marled to the eye of the lift).

Where do the fore, main and mizzen royal yard ropes belay?

The fore at the starboard fore pin-rail; the main at the port main pin-rail; and the mizzen at the starboard mizzen pin-rail.

Reeve the fore?

It is taken up abaft and rove through the sheave in the royal mast from aft forward, the standing part hooks, with sister hooks, to the slings of the fore royal yard. The main and mizzen are rove the same. Substitute *main* and *mizzen* for *fore*.

Reeve the fore royal halliards?

They reeve exactly as the fore topgallant halliards, except they are on the starboard side of the top, the upper block is tailed or hooked to the yard rope (under the eyes of the top mast rigging), the lower block is hooked to the upper part of the lower trestle-trees, on the *starboard side*, the fall leading down through the lubber's hole to the starboard fore pin-rail; frequently royal yard ropes are used as halliards, with a block in the bight. The main and mizzen reeve the same, except the main is on the port side. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen royal sheets belay?

At their respective pin-rails, (sometimes they belay in the tops).

Reeve the fore ?

They are single. They reeve through leaders in the fore rigging, through the lubber's hole to the after sheaves in the quarter blocks under the topgallant yard, then along the yard up through sheaves in the topgallant yard arms; the standing parts toggle to the clews of the royal. The main and mizzen reeve the same. Substitute *main* and *mizzen* for *fore*.

Where do the fore, main and mizzen royal clewlines belay ?
To their respective pin-rails, (both sides).

Reeve the fore ?

They reeve through fair-leaders on the fore rigging, through the lubber's hole to the quarter blocks under the royal yards, the standing parts hook, with sister hooks, to the clews of the royal. The main and mizzen reeve the same. Substitute *main* and *mizzen* for *fore*.

RUNNING RIGGING ON THE MAIN AND MIZZEN MASTS AND YARDS.

Where do the main braces belay ?

On cavils, in the after part of the mizzen pin-rail (both sides).

Reeve them ?

They reeve through the bulwark sheaves, on the quarter, to blocks on the main brace bumpkins, forward to the brace blocks at the main yard-arms, from down up, then aft, and the standing parts are hooked or clinched to the bottom of blocks on the bumpkins. On board of large ships it is sometimes found convenient to fit the standing part with a jigger (which is fitted aft at the bumpkin).

Where do the main tacks belay ?

To the iron bits in each gangway.

Reeve them ?

They are rove through large blocks, hooked in the deck, up to large blocks shackled to the spectacle-irons, and the standing parts are hooked to bolts in the deck (in each gangway).

Where do the main sheets belay?

To the iron sheet bitts on each side of the quarter deck, sometimes in light weather to the cleats, on the inside of the bulwarks.

Reeve them?

They reeve exactly as the fore sheets reeve, simply substitute *main* for *fore*.

Where does the main bowline belay?

Forward, at the main stay or fore fife-rail.

Reeve it?

The main bowline consists of a whip and runner; the runner has a single block in one end, the other end is rove through the thimbles in the bowline bridle, and the standing part is made fast to the fore fife-rail or main stay. The whip is rove through the block in the end of the runner, and the standing part secured to a bridle on the main stay. In tacking ship, the standing part of the runner is let go, and the bowline shifted over. Another simpler way is to reeve a line through the bull's eye on the bowline bridle and secure the standing part to the main stay.

Where do the main buntlines belay?

Forward on the main stays (both sides.)

Reeve them?

The upper legs are rove the same way as the fore, and the lower standing parts are crossed (to keep the turns out) and seized to the main stay, the hauling parts reeving through blocks seized there for that purpose. On steamers, main buntlines are rove up and down the main mast, on account

of the heat from the smoke-stack. This is a neater and better lead.

Where do the main topsail braces belay?

At the mizzen topsail sheet bitts (both sides); they lead forward on the quarter deck.

Reeve them?

They are rove through the *outer* sheave in the mizzen topsail sheet bitts from forward aft, up to hanging blocks on the mizzen mast (about half way between the deck and the top), then forward to the brace blocks on the main topsail yard-arms, from down up, aft again, and the standing part is secured to a band which travels up and down the mizzen topmast, with the parrel; in order to shift the strain lower down, as it becomes greater, and sail is reduced.

Where do the main top bowlines belay?

At the fore pin-rail, both sides.

Reeve them?

They reeve through single blocks, under the after rim of the fore top, then aft, and the standing parts are toggled to the bowline bridles on the main topsail.

Where do the main topgallant-studding-sail-boom-tricing-lines belay?

In the main top, at the forward shrouds of the main topmast rigging.

Reeve them?

They are rove through blocks seized well up on the forward shroud of the main topmast rigging, and to a becket on the heel of the studding sail boom.

Where do the main topmast staysail halliards belay?

At the port main pin-rail.

Reeve them?

From aft, up through a block at under part of the topmast

trestle-trees, down through a block in head of the sail, and the standing part is secured to the collar of the topmast stay.

Where does the main topmast staysail downhaul belay?

At the port fore fife-rail.

Reeve it?

It reeves through a block secured near the lower part of the stay, and the end is taken up and clinched to the head of the sail.

Where do the main topmast staysail sheets belay?

To cleats, on the deck, near the forward part of the main pin-rail (both sides).

Reeve them?

They are composed of two single blocks, and a fall rove as a gun tackle purchase, the upper block being hooked to the clew of the sail, and the lower one to a bolt in the water way, near the gangway. They are sometimes fitted as a whip and pendant.

Where do the main topgallant braces belay?

At the composition pin-rail, on the lower part of the mizzen mast (both sides).

Reeve them?

They are rove the same as the fore topgallant braces. Substitute *main* for *fore*.

Where do the main royal braces belay?

At the composition pin-rail, on the lower part of the mizzen mast (both sides).

Reeve them?

They reeve the same as the fore royal braces. Substitute *main* for *fore*.

Where do the cross-jack braces belay?

At the after part of the main pin-rail (both sides).

Reeve them?

They are rove through the leaders at the main pin-rail, up to a double block, which is hooked to an eye-bolt on each side of the main mast, in a line with the yard; then to the brace block on the cross-jack yard, forward again, and the standing part is secured to the double block at the main mast.

Reeve the mizzen topsail tye?

It is single; a thimble is turned in one end, the other end is rove up through a sheave in the topmast, down through the tye-block on the yard, up through the trestle-trees, and is clinched around the topmast-head. The Bell's purchase is frequently used on the mizzen.

Where do the mizzen topsail halliards belay?

At the after part of the port mizzen pin-rail.

Reeve them?

They are rove the same as the fore topsail halliards, except they are single. Substitute *mizzen* for *fore*.

Where do the mizzen topsail braces belay?

At the main pin-rail (both sides), just abaft the cross-jack braces.

Reeve them?

They are rove through the leaders at the main pin-rails, up through the lubber's hole to blocks at each side of the main cap, aft to the brace blocks on the mizzen topsail yards, and the standing parts are secured to the straps of the blocks at the main cap.

Where do the mizzen top, bowlines belay?

At the after part of the main pin-rail (both sides).

Reeve them?

They reeve through the leaders at the main pin-rail, up to the outboard sheaves of the cross-jack brace blocks (on the main mast) and the standing parts are toggled to the bowline bridles on the leech of the mizzen topsail.

Where do the mizzen topgallant braces belay?

At the main pin-rail (both sides), just abaft the mizzen topsail braces.

Reeve them?

They reeve through leaders at the main pin-rail, up through the lubber's hole to the small sheaves in the main topmast trestle; then aft, and the standing parts go over the topgallant yard-arms, with eyes that are marled to the eyes of the lifts, or with spectacles, as before described.

Where do the mizzen royal braces belay?

At the main fife-rail (both sides), just abaft the mizzen topgallant braces.

Reeve them?

They are rove through leaders at the main fife-rail, up through the lubber's hole, through sheaves in the after chock of the main topmast trestle-trees; then aft, and the standing part goes over the mizzen royal yard-arm with an eye that is marled to the eye of the lift, or with spectacles, as before described.

GEAR ON SPANKER AND TRYSAIL.

Where does the spanker boom topping lift belay?

To a cleat under the spanker boom.

Reeve it?

The standing part is hooked to a bolt near the end of the boom, then rove up through a gin-block at the hounds of the spanker gaff, then down through a sheave in the boom; a thimble is turned into the end, to which a small tackle is hooked, called a topping lift *fall*.

Where do the spanker sheets belay?

On each side of the stern bulwarks.

Reeve them?

The spanker sheets are composed of two double blocks,

the fall being rove first through the block hooked on the iron band of the boom, then through the block at the side, and so on, the end being secured to the block of the boom.

Where does the spanker foot-outhaul belay?

On the inner end of the spanker boom, starboard side.

Reeve it?

It is rove through the sheave on the end of the spanker boom, up through a block hooked to the clew of the spanker, and the standing part is hooked or clinched to the end of the spanker boom.

Where do the spanker and trysail head or peak outhauls belay.

The spanker, to the band at the mizzen mast. The trysails, to the fore and main five-rails respectively.

Reeve the spanker-head outhaul?

The end is clinched to the head of the sail, and passes out through a sheave at the end of the gaff, thence through a block under the after part of the mizzen top. To the end, a single block is secured, and through it, a whip is rove. The trysail peak outhaul is rove the same.

Where do the spanker, fore and main trysail vang belay?

The spanker vangs on each side of the bulwarks, at the stern of the vessel. The main trysail vangs, at the after part of the main pin-rails (both sides). The fore trysail, at the after part of the fore pin-rail (both sides).

Reeve the spanker vangs?

They are composed of two single blocks, one of which is hooked to the gaff, and has a short pendant attached, the other is hooked to the water ways on each side near the stern. The falls are rove up through the upper block, then through the lower, and the end secured to the upper block. The vangs for the trysails are rove the same.

Where do the peak or head downhauls for spanker, fore and main trysail belay?

For the spanker, at the band on mizzen mast, starboard side. The fore and the main trysails, at their respective fife-rails; the fore on starboard side, the main on port side.

Reeve the spanker head downhaul?

It reeves up through a block secured to the jaws of the gaff on the starboard side, and clinches to the head of the sail. In large vessels a whip and runner is used. Those for the fore and main trysails are rove the same.

Where do the clew ropes belay for the spanker, fore and main trysails?

At their respective bands or fife-rails.

Reeve the clew rope for spankers?

It reeves up through the inner sheave of the block on the starboard jaw of the gaff, and is clinched to the clew of the spanker. Those for the trysails are rove the same.

Where do the brails belay for the spanker, fore and main trysails?

The spanker brails at the mizzen mast; the main trysail brails at the main fife-rail; and the fore trysail brails at the fore fife-rail.

Reeve the upper, middle and lower brails of spanker?

The brail blocks through which the brails lead, are seized on both sides of the luff of the sail at proper distances, each brail is then rove through its own blocks, the *bight* of each being seized to the after leech of the sail. Those for the trysails are rove the same.

Where do the halliards of the fore, main and mizzen storm staysails belay?

Fore and main at their respective fife-rails, and the mizzen at the band on the mizzen mast.

Reeve the fore storm staysail halliards?

From the deck on the starboard side, up through a block on the slings of fore yard, then down through a block on the head of the sail, and the end taken up and secured to the collar of the fore stay.

FOOT ROPES AND STIRRUPS, ETC.

How are the foot ropes for the lower yards fitted?

They hook to a shackle, which is over the ear or eye on the after part of the brace band, at the hounds of the yard, then go into the slings and are seized to the opposite side of the iron truss (forward of the mast), being seized again to the truss arm on their own sides of the yard.

How are the foot ropes for topsail yards fitted?

They are fitted the same as the lower yards, except at the slings they go abaft the topmast and are seized to the opposite quarter of the yard, being leathered in the wake of the mast to prevent chafe.

How are the foot ropes for the topgallant and royal yards fitted?

The topgallant go over the yard arms with an eye (inside of the lift and brace), and are hooked to the opposite quarter of the yard, abaft the mast, when at sea. The royal go forward of the mast.

How are stirrups fitted?

They are seized to the iron jack-stays, and the lower ends are spliced around the foot ropes on their respective yards.

How are the flemish horses fitted on the lower and topsail yards?

They go over the pacific irons, with an iron thimble and eye, and are seized or hooked to the outer quarters of the yards.

LIFTS.

Where do the lower lift jiggers belay ?

The fore to cleats on each side of the fore mast ; the main to cleats on each side of the main mast ; the cross-jack to cleats on the mizzen mast.

Reeve the fore lift ?

The standing part of the lift is hooked to the bottom of a large iron-bound block hooked to the lower cap, then through block at the yard arm back through forward sheave of block at cap, down through lubber's hole ; a thimble is turned into the lower end to which a double purchase is hooked, called a lift jigger.

The main lift is rove in the same manner. The cross-jack lift is single, and has a single fall.

Reeve the fore topsail lift ?

These shackle to bands at the yard arm, and reeve up through the lower sheave of sister block in topmast rigging, thence down through lignum-vitæ bull's-eyes, secured to the collar of the fore stay at the eyes of the rigging ; the ends are taken up and secured to their own parts, by means of selvaie straps and toggle.

The main and mizzen reeve in the same manner.

Reeve the fore topgallant and royal lifts ?

They go over the yard arms with eyes, or splice to spectacles, and reeve through sister blocks, or bull's-eyes, in their respective rigging, setting up the same as topsail lifts. The main and mizzen are rove the same way.

STUDDING SAIL (PRONOUNCED STUN' SAIL) GEAR.

Where do the lower boom topping lifts belay ?

At the fore fife-rail (both sides).

Reeve them ?

They are taken up and reeve through the after sheave of the block at the lower mast-head, out and down, through a gin block at the fore yard arm, and thence to the lower boom. When not used on the boom, they are kept triced up under the fore yard.

Where do the forward guys belay?

At the fore-castle pin-rail (both sides).

Reeve them?

They are rove through the fair-leader in fore-castle pin-rail, then through a block on the bowsprit, thence aft and through the forward block on the lower boom and taken to a bolt near the end of the bowsprit, where they are hooked.

Where do the after guys belay?

At the after part of the fore pin-rail (both sides).

Reeve them?

The end is rove through the sheave hole in the bulwarks, and then through the after block on the lower boom, aft again, and the standing part hooked to a bolt in the side of the ship.

Where do the lower studding sail halliards belay? Outer and inner?

To the fore fife-rail (both sides).

Reeve them?

The end is taken up through the lubber's hole, and rove through span blocks, which are at the topmast head, then down and through a block or sheave at the ends of the topmast studding sail booms, and thence to the deck (kept triced up when not in use). For the inner halliards use the fore clew jiggers.

Where do the lower studding clewlines belay?

At the fore fife-rail (both sides).

Reeve them?

They are rove through a block secured to the fore yard truss, then through a block at the inner part of the lower studding sail yard, and thence to the outer clew or corner of the lower studding sail (the clewline is always kept in the sail). Sometimes they reeve through a glut in the centre of the sail.

Where do the lower studding sail sheets belay?

To a cleat on the forecastle, or to the forward pin in the fore pin-rail.

Reeve them?

The sheets being made fast to the sail, are taken through a block at the heel of the boom (sometimes a bull's-eye is used), and through the bulwarks, in on deck.

Where does the lower studding sail out-haul belay?

To a cleat near the after part of the fore pin-rail.

Reeve it?

It is rove through a sheave in the bulwarks, near the gangway, then through a block hooked to the top of the outer end of the boom, and then hooked to the outer clew of the studding sail.

Where do the topmast studding sail halliards belay?

At the fore pin-rail (both sides).

Reeve them?

They are taken up abaft all, and in a line with the topmast backstays, and rove, from aft forward, through a block at the topmast head, then forward through a block hooked to the pacific iron on the topsail yard, (called a jewel block), and from there to the deck, abaft the sail. They are made fast to the clews of the topsails when not in use.

Where do the fore topmast studding sail sheets belay?

There are two, a long and a short sheet; the long sheet goes to the deck, the short sheet belays in the fore top.

Reeve them ?

The long sheet is made fast to the sail, at the inner clew, and the end belayed to a cleat on the fore-castle. The short one reeves through a bull's eye on the fore yard and belays in the fore top.

Where do the fore topmast studding sail tacks belay ?

At the forward pin, main pin-rail.

Reeve them ?

The end is rove through a block secured to the main swifter, then through a block at the end of the topmast studding sail boom, from *aft forward*, and thence to the outer clew of the topmast studding sail.

Where do the fore topmast studding sail boom braces belay ?

At the forward end of the main pin-rail.

Reeve them ?

Through the block at the main swifter, and the end secured to the topmast studding sail boom.

Where do the fore and main topgallant studding sail halliards belay ?

The fore at the fore pin-rail, the main at the main pin-rail.

Reeve the fore ?

They are taken up abaft all, and in line with the topgallant backstays, then through a span block at the topgallant mast-head, and thence forward through a jewel block at the end of the topgallant yard, and to the sail, which is kept in the top.

Where do the fore and main topgallant studding sail sheets belay ?

The fore at the fore fife-rail, (both sides) ; the main at the main fife-rail, (both sides).

Reeve the fore ?

One end is secured to the sail, and the other is taken down abaft, through the lubber's hole, and belayed to the five-rail.

Where do the fore and main topgallant studding sail tacks belay ?

The fore at the fore pin-rail, (both sides); the main at the main pin-rail, (both sides).

Reeve the fore ?

They are rove through tail blocks at the foretop rim (each side), out through the blocks at the ends of the topgallant studding sail booms, and the standing parts are clinched to the outer clew of the topgallant studding sail. The main is rove the same. Substitute *main* for *fore*. They are sometimes belayed in the tops, to cleats.

MISCELLANEOUS.

What are heel ropes ? Their use ?

They are lines made fast to the heels of topgallant masts, jib and flying jib-booms. On the topgallant mast they assist in sending down the mast. They are attached to the jib and flying jib-booms to rig them out.

What are gear tricing lines ? Their use ?

Small ropes, to one end, of which, is attached a peculiar shaped hook; they are rove through a block well up on the forward shroud of the fore rigging. They are used for tricing up the topmast and lower studding sail gear when not in use.

What is a squilgee strap ?

A three-legged strap or bridle secured to the studding sail yards, and taken around the sail, the ends (in which eyes are worked) being secured together by a greased toggle, which is hauled out, when ready, letting the sail free.

What is a snorter? Its use?

Small ropes, the outer end of which is spliced in the iron eye, at the yard arm, of the light yards; the inner end is stopped into the slings of the yard. The eye of the lift and brace fit, on the yard arm, *over* the snorter. It is used when sending down light yards, to pull off the lower lift and brace. The yard arm end of the snorter is unlaïd and made up again in flat sennit, about a fathom in length.

What is a tripping line?

A small line, long enough to reach the deck when bent to the inner end of the snorter on the light yards, when aloft. It is used to trip the yards, and by pulling on the snorter, haul off the lower lift and brace, and afterwards to guide the yard to the deck.

What is a timenoguy?

Any piece of rope placed to prevent rigging from chafing or fouling, such as that between the main rigging and the sheet anchor stock, to keep the main tack and sheet clear of the hammocks in working ship.

What are preventer braces?

Braces used to assist the permanent braces in supporting the yards, during heavy weather; they are set taut on the weather side, the blocks at the yard-arms being fitted with long pendants that go around the yard. The standing parts and hauling parts lead to some convenient place aft, that will give the brace a good, fair lead.

What are clothes lines?

Parallel lines on which wash clothes are stopped to dry. The habor lines extend from the bowsprit to the spanker boom, and are triced well up to the lower yards. The sea lines extend from the main to the mizzen rigging.

What are Irish pennants?

Rope yarns or loose ends hanging about the rigging.

QUESTIONS ON PURCHASES.

What purchase is used for the flying-jib halliards?

A single whip.

What is used for jib halliards?

A gun tackle purchase, or a whip and runner.

What is used for the foretopmast staysail halliards?

A whip and runner.

What purchases are used for head downhauls?

Single whips.

What are used for jib and staysail sheets?

Gun tackle purchases.

What are used for flying-jib sheets?

Single whips.

What purchases are used for lower and topsail braces?

Gun tackle purchases.

What are used for the topgallant and royal braces?

Single whips.

What purchase is used for hoisting the fore and main topsail?

A tackle and double runner.

What are used for hoisting topgallant and royal yards?

A tackle and single runner.

What purchase is used for topsail clewlines?

Whip and runner.

What for topgallant and-royal clewlines?

Single whips. Large vessels, double whips.

What purchases are all buntlines?

Single whips.

What purchase is the cat fall?

Treble purchase, or six sheaves.

What purchases are boat falls?

Double purchase, or two double blocks.

What are the spanker sheets?

Double purchase.

What purchase have the lower reef pendants?

Double whip and runner.

What purchase has the spanker head outhaul?

Single whip and runner.

What purchase is used for yard and triatic stay tackles?

The double purchase, or four sheaves.

What are jeer falls?

The treble purchase, or six sheaves.

CHAPTER XIII.

BENDING, LOOSING, FURLING, MENDING SAIL, REEFING SAIL,
SQUARING YARDS.

Printed *station billets* are served out on board vessels in the navy, stating clearly each person's station for the different evolutions and exercises. These billets must be carefully studied and thoroughly understood, so that the proper station can be taken, at an exercise or evolution, without a moment's delay.

How are all square sails secured to the yards?

With head earings and robands. As a square sail is roped on the after side, always bend with the roping *between the sail and the yard*, otherwise the stitches would be chafed. The head earings are secured at each yard-arm, and the robands are made fast to the jackstay on the yard, with the necessary turns and a square knot.

Are the topgallant sails and royals bent to the yards aloft, or while they are on deck?

While they are on deck.

In bending and unbending a topsail, what ropes are bent and unbent?

Sheets, clewlines, reef tackles, bowlines, buntlines, and buntwhips (if bent).

What is used for sending a topsail aloft?

A sail tackle (top burtons being used for that purpose) the upper block of which is hooked to a strap secured to the collar of the topmast stay.

In unbending, what ropes are used to lower a topsail on deck?

The buntlines; they are hitched around the bunt of the sail. The yard-arms of the sail are securely stopped with rope yarn stops. If at sea, blowing hard, use a sail burton.

In bending and unbending a course, what gear is bent and unbent?

Tacks, sheets, clewgarnets, reef pendants, buntlines, and leechlines.

How many methods of making up square sails for bending?

Two general methods. Sails made up "*as square*," and sails made up "*as furled*." When stowed in the sail room, sails are generally made up *as square*, for convenience in stowing.

How pass a roband in the head-holes of the sails?

Double the roband, and pass the bight through the head-hole, take one end, pass it over the sail and through the bight, then haul taut both ends.

Make up a course (square) for bending?

Stretch the head of the sail well taut along the deck, having the *roping on the under side*, bring up to the head the belly band, then the foot, leaving the clews out at each end, also the bowline bridles and buntline toggles, roll up taut; pass the head earing around the sail close inside the leech rope, and put a good stop to every seam. The reef earings are made up in the sail. By making the sail up in this manner the head and foot are both left out for bending the gear.

TO BEND A COURSE.

Toggle the buntlines to the foot, at each side of the midship seam, and clinch the leechlines to their cringles, stopping both to the head of the sail, the former to the eyelet

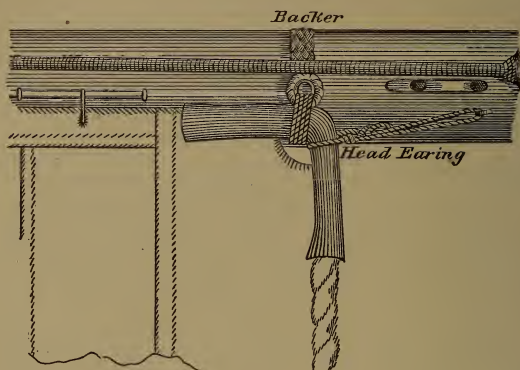
of the middle roband, and the latter in the wake of their leading blocks. Hook yard-arm jiggers (usually the clew-jiggers) from straps around the pacific-iron to the first reef cringles, hitch the head earings to the neck of the blocks, or stop them along the head of the sail. Shackle on the clewgarnet blocks (with the falls rove) to the after part, passing them *under* the sail. Shackle the tacks and sheets, station hands to light them up, as the sail goes aloft.

Hands are sent on the lower yard, trice up the booms, man the gear, and SWAY ALOFT! merely gathering up the slack of the clew-garnets. When HIGH ENOUGH! (when the centre of the sail reaches the centre of the yard), cut the buntline and leechline stops (cutting *from* the sail), after making fast the midship roband, together with three or four others at each side of it, by passing the *short* ends *under* the jackstay from *forward aft*, and the long ones, over and *under*, from *aft forward*, back through the eyelets, and *square knot* them on top. "BRING TO!" haul the sail out until the head-rope is taut along the yard, and pass the earings for a full due. Now make fast the remaining robands in the same manner as the midship ones, and hook the reef pendants; haul up the clewgarnets snugly. Now slack down and overhaul the gear. Set the sail, and if all is rove right, clew up and furl. As a general thing in bending a *course* in this manner, the tacks, sheets and all gear, are bent on deck. The yard-arm jiggers are shifted to their proper places as clew jiggers. If the tacks and sneets are not bent on deck they are triced up by the clew jiggers.

How do you pass a head-earing?

Pass the end of the earing through the bolt on the yard, then through the head-earing cringle, hauling out the head

of the sail taut along the yard. Now pass five or six turns of the earing through the backer (a piece of flat sennit, nailed on top, fore-and-aft the yard, a thimble end hang-



HEAD-EARING PASSED.

ing forward), through the cringle from aft forward, and back again, hauling the turns well taut, and securing the end of the earing neatly to its own part.

Make up a topsail (square) for bending?

Stretch the head of the sail taut along the deck, the *roping or after side* down. Bring the second reef band up to the head, and lay all the points and earings snugly along, bring up the belly-band, and then the foot. The clews, bowline-bridles, reef tackle, cringles, and buntline toggles, should be left out, so that, when the sail is sent aloft for bending, the sheets, reef tackles, bowlines and buntlines, can be bent without loosing the sail; which will be found of great advantage when blowing fresh. Roll well up, put good stops at each seam, and expend the head-earings round the ends of the sail.

To Bend a Topsail.

Hook the top burton (for a sail tackle) to the strap at the collar of the topmast stay, and also to one bight of a sail strap, which has been passed around the centre of the sail; *seize* the other bight of the sail strap to the back of the hook, or to the strap itself, around its own part, this will form a running eye.

Overhaul the sheets and reef tackles, bringing them into the top ready for bending; have the bowlines, buntlines, and clewlines ready for toggling and bending to the sail. (Bowlines are not toggled at once, unless shifting topsails on a wind.) Hands are sent aloft on the yard, the tackle manned, *trice up the booms*, and "SWAY ALOFT!" When the sail rises above the top, cut the stops (*cut from the sail so as not to injure it*).

Shackle the sheets, hook the reef tackles into their *own cringles*, stopping the head-earing cringles to them, shackle the clewlines to the clews, and toggle the buntlines and bowlines to the foot, and to the bridles respectively. Now haul out on the reef-tackles and lower the sail (with sail tackle), until the head is stretched along the yard, and the centre comes flush with the centre of the yard; *pass the midship roband*, rouse out the head-earings, cutting the seizing of the strap around the sail; at the same time take in the slack of the buntlines and clewlines, *pass the earings and the remaining robands*. Now unhook the sail tackle from the stay, overhaul the gear, DOWN BOOMS! MAN THE SHEETS! SHEET HOME! and hoist the sail to a taut leech. After which, settle away the halliards, clew up and furl.

Sometimes reef tackles are hooked to the second reef cringle before hauling out, and are shifted to their own cringles after the sail is bent; but the head-earing can be

hailed out, and the head hauled taut along, when the reef tackle is hooked to its own cringle; and there is then no shifting of reef tackles after the sail is bent.

How is a square sail furled?

The leeches are hauled in along the yard. The ends of the reef points, gear, and all slack sail is passed in towards the bunts, to give the sail a gradual increase in that direction. When the sail is nearly rolled up, hook the bunt-whip, and bouse the sail well up, lower the buntlines and clew-jiggers (if hooked), and shove the sail well into the skin; roll the sail up snug, keeping the bunt square and the skin smooth, pass the gaskets square, (the bunt gaskets cross) lay in off the yard, lower and square the booms, stop up the gear.

When a sail is neatly furled it appears neither above nor below the yard; the earings are well slewed up, the sail smooth under the gaskets, the bunt square, and a taut smooth skin, no rope's ends hanging down, and the gaskets perfectly square. Too much sail should not be left abaft the yard to be stowed in the back cloths, as when these latter are hauled over, it will give a bunchy, slouchy look, about the bunt, as seen from abaft.

How are jibs and staysails secured to their stays?

Galvanized iron hanks travel on the stays. These hanks are secured to the eyelet's holes in the head (or luff) of the sails, with robands of spun yarn.

In bending, which side is a jib sent out on?

On the port side, (the opposite side from its downhaul) so that in going out, it will not ride on the downhaul. If at sea, send it out on the weather side.

In bending, which side is a flying-jib sent out on?

On the starboard side, (the opposite side from the down-

haul) and also, the wythe inclining to the starboard side will bring the flying-jib-boom over.

In making up a jib for bending, how determine the head from the tack?

By the roping being on the port side of the sail, and also by the cloths, the *short cloths* being at the tack, and the *long cloths* at the head.

Make up and send out a jib for bending?

Commencing at the tack (or lower outer corner) of the jib, make it up by bighting it along the head, until the head cringle (or upper corner) is reached, to which, hook *and mouse* the halliards; pass a strap or small lashing around all the bighted parts of the sail, and to this make fast the downhaul, also stop the halliards to it. To the clew (or lower after corner), bend a rope called a clewrope. Now man the halliards and hoist the sail well clear of the forecastle; man the downhaul and rouse the sail out to the boom; slacking the halliards and clewrope as the sail goes out; shift the downhaul to the head-crinkle and bend it there, remove the strap or lashing, make fast the robands to their proper hanks, unbend the clewrope, and shackle the sheets.

Furl a jib?

Haul it close down, gather the slack sail from the foot and let it hang down between the furler and the boom, gather the rest of the sail, in neat folds, along the top of the boom, and when all is snugly in place, pull up this spare sail and cover the rest of the sail with it; pass the gaskets. This makes a neat furl, especially if the covers are not to be used. If in port, the cover is placed over and the stops tied. If at sea, pass the sea-gasket around the boom and sail.

In port, before the covers are put on jibs and staysails.

the *halliards* should be stopped to the foot of the stays, so that, when the halliards are hauled taut, the heads of the sails will not pull out of the cover. Before stopping the halliards, a hand should ride the hanks down, then set taut the down-haul and belay.

How are topgallant sails and royals bent?

They are bent while the yards are on deck. The robands are passed like those of the courses and topsails; the head-earings are passed as follows. The sail is hauled taut along the yard and the earing passed through a staple or thimble on the yard-arm, then passed through the head-crinkle from *down up* and taken aft around the yard, then again around the yard *without passing through the head-crinkle*; this is called a riding turn, and is for the purpose of keeping the sail well up *on top* of the yard. The remaining turns of the earing are passed around the yard and through the crinkle, the end being either square knotted, or passed with frapping turns around the parts going to the staple or thimble. The buntlines, clewlines and sheets are bent after the yards are crossed.

In furling a topgallant sail or royal, for going aloft or coming on deck, it should be rolled up with a *long low bunt*, and the clews tucked in, to avoid tearing the sail in its upward or downward passage. If furling aloft, be careful to get a smooth skin and a *long, low, tapering bunt*.

Be careful in furling light sails, especially royals, not to get "clew bound," that is, leave plenty of sail at the clews, so that, when stowed, the clews will not depress the bunt.

How is a spanker or trysail bent?

The downhaul and clew rope are overhauled and made fast around the sail near the head, they are then manned and the sail hoisted to the gaff. Shackle the luff or nock

of the sail to the gaff, hook the head outhaul and pass the robands to the gaff and mast ; reeve the brails, hook the foot outhaul, and clinch the clewrope. When the robands are passed, lash the tack to the neck of the boom, or to an eye-bolt in the after part of the mast.

In bending try sails or spanker with hoops running on the gaff, it is better to lower the gaff to the deck, bend the head, and then hoist the gaff, bending the *luff* as it goes up.

How furl a spanker or try sail ?

The clewrope is hauled up, the sail brailed close up and the furling line passed. If in port, the cover is tied or stopped around the sail, commencing aloft and working to the deck.

How are topsails made up (as furled) and bent ?

With this method the gaskets should be sewed to the heads of the sails at equal distances. Make the laniards a fathom long.

In making the sail up, the main point to aim at, is keeping the yard-arms as light as possible, so that the sail may haul out taut, all along, more easily.

Seize the sail straps to the heads of the sails at the middle eyelet holes, and when using them, after the sail is rolled up, carry the *foremost leg* around the *after leg*, and seize its bight to its own part. In case this seizing is cut too soon, by having the strap fast to the head of the sail, the mistake may be partly remedied by a pull on the sail tackle, which is always *hooked to the after leg*.

To Make up the Topsails.

Haul the head of the topsail along the deck, after side down, gather all the slack canvas back from the head, and haul the head taut, fore-and-aft, by the earings. Bring in

the leeches, as far as the reef tackle cringles, along the head, keeping these cringles out, knot the fourth reef earing into the third reef cringle, and the third into the second; carry the clews into the quarters about *six feet* over the head; bring the buntline toggles about a foot over the head between the clews; coil all the remainder of the roping so as not to ride, leaving the bowline cringles out; face the foot and *gather up*, then face the head and *roll up*, pass the gaskets taut; stop the clews up with heavy quarter stops *abaft* the head, after having passed them over the fore part of the bunt; seize the sail strap; hook the sail tackle; knot the second reef earing into the first reef cringle, the first into the head, and stop the head earings along the top of the sail, on each side; lead the fall of the sail tackle through a block tailed to the sail strap, and take it well forward—this will guy the sail clear of the top, and stays, or a guy can be bent on from forward; overhaul the sheets, clewlines and reef tackles into the top.

To Bend.

MAN THE BURTONS! The fall is manned, one hand to tend the stopper and one to belay. A few hands to take in the slack of the buntlines and belay. SWAY ALOFT! and HIGH ENOUGH! when the clews of the sail have been swayed above the top rim, and the turns slewed out.

Take a turn with the sail tackle fall, bend the reef tackles to *their own* cringles, and hook the bunt whip.

Keep a good strain on the bunt whip as the sail tackle is lowered on, hauling the reef tackles out. If the quarters of the sail are allowed to get below the yard they are not easily raised.

The men are sent aloft, and at the order: LAY OUT AND

BRING TO! carry the head earings out to the yard-arms, haul the head of the sail taut along the yard, pass the robands—the *midship roband first*—hook the clewlines, toggle the buntlines and bowlines, cut the seizings of the sail strap, furl the sail, or set it to ascertain if the gear is properly bent.

If the reef tackles will not answer, yard-arm jiggers must be put on for the express purpose of hauling out the head of the sail.

How is a course made up (as furled) and bent?

Haul the head of the course taut along, roping down (after side on deck) on top of the sail strap, make the reef earings fast to the cringles as before explained. Gather the slack sail back from the head, and lay the second reef band on the head, hauling the earings taut out, bring the leeches, in taut, as far as the inner leech line cringle and lay them on the head, lay the clews over the head about six feet on each side of the middle of the sail, and lay the buntline toggles about a foot over the head, between the clews. Now gather up as in furling (facing the foot) throw the skin over; face the head and roll up snugly, pass the gaskets; stretch the sail across the deck, forward of its mast and under its own yard; overhaul down the yard-arm jiggers and proceed to bend the gear; pass the forward leg of the sail-strap over the bunt of the sail, round the after leg of the strap and seize its bight to its own part; pass heavy quarter stops around the clews. Make the stay whip fast well up on the slings of the yard, and hook on to the after leg of the sail strap, sway the sail up and down; and when well clear of turns, bend the reef pendants, hook the yard-arm jiggers to the second reef cringles *over the tacks and sheets*, bend the buntlines, leechlines, tacks, sheets and clew garnets.

Overhaul the clew garnets, tacks and sheets, SWAY ALOFT! LAY ALOFT! TRICE UP! LAY OUT! and BRING TO!

Round up the clew garnets; bring to the head of the sail; cut the seizings of the strap; pass the laniards of the gaskets through the staples on the yard, or through the reefing jackstay.

STUDDING SAILS.

How are they bent?

The outer earings which are spliced into the cringles, with a short eye, are passed, through holes bored in the extremities of the yard, from the after side, then back through the cringle and *around* the yard inside the hole, until three or four turns are taken, when the end is hitched through the cringle and around the single part. The sail is then brought taut along the yard, the inner earings being passed in the same manner, and the head rope secured by a neat lacing of roundline rove around the yard and through the eyelets, with a marline hitch, on top, at each of the latter, or they are sometimes bent with robands passed through the eyelets and around the yard. The gear (sheets and downhaul) is bent as described in *running rigging*, and the sail made up, on the after side, by bighting the leeches towards the head, and running the gear along the yard.

Make up a topmast studding sail when not bent?

Stretch the sail taut along and overhaul the downhaul through the thimble and block, and bight it along the whole length of the leech. Then roll up towards the inner leech, lay the sheets along the whole length of the sail, roll up *over all*, and stop the sail up with rope yarns.

A topgallant studding sail is made up in the same manner.

Make up a topmast studding sail when bent?

Overhaul the downhaul the length of the luff or outer

leech, then take the foot up to the yard and place the tack-block out; bight the downhaul along the yard, also the sheets, roll the sail up snugly and stop it with rope yarns, or better still, have a centipede on the yard.

Lower studding sails are bent and made up in the same manner as topmast studding sails, with the sheet in, with this exception, that part of the lower studding sail that the yard does not spread, is laid right over the part, that the yard does spread, and is then rolled up.

When ready for sea topgallant studding sails are kept up and down the topmast rigging.

The other studding sails are rolled up and stowed in the booms.

While at sea, and circumstances render a frequent use of these sails liable, topmast studding sails are sometimes triced up and down the fore rigging, and the lower studding sails, triced up and down the foremast. They are, by this means, always at hand and ready for bending the gear. Studding sail covers are sometimes sewed on to the, forward side of the, head of the sail, and are very useful.

LOOSE SAILS.

To dry.

All hands are called to "*loose sail*," and as soon as the people are up, at the order, LAY ALOFT READY MEN! The captains of the tops, two fore and two main yardmen, lay aloft. The booms are got ready for tricing up, clew jiggers hooked (if ordered), gear well overhauled and covers taken off the fore-and-aft sails and stops on the halliards cut, "ready men" laying down at the order.

At the order ALOFT SAIL LOOSERS! the men lay aloft and get on the slings of the proper yards, *keeping close into the slings.*

At the order, MAN THE BOOM TRICING LINES! TRICE UP! the booms are triced up the proper distance, to allow room for the men to work on the yards.

LAY OUT! LOOSE! The men, at this, lay out on the yards, casting off the gaskets, but keeping the sail *well up on the yard*; the topsail clew jiggers (if hooked) and bunt-lines are manned on deck, ready for pulling up; gear well overhauled. When all ready, LET FALL! The sails are pushed well clear of the yards, the gear pulled up and squared.

LAY IN! LAY DOWN FROM ALOFT! At this, lay in off the yards and lay down on deck at once. The evolution is not completed while even one straggler is above the rail.

The booms are left triced up, the clew jiggers and bunt-lines are usually left square with the yard, the jibs spread out, and the spanker and trysail brails slacked up.

If the light sails are in the rigging, they are loosed and let fall with the rest.

If the sails are reefed when loosing, first *let fall* and then shake out the reefs.

Loosing, preparatory to making sail, is done in precisely the same manner, except that the clew jiggers are *not* hooked, the gear is not manned to haul up, and the booms are slacked down as soon as the men are in off of the yards.

LOOSE TO A BOWLINE.

All hands are called, *loose sail to a bowline*.

Heave the rigging off the pins, lead it out or coil it down clear for running.

If the light yards are crossed the order is given, ALOFT SAIL LOOSERS OF THE TOPGALLANT SAILS AND ROYALS! When the royal yard men are to the topmast cross-trees.

and the topgallant yard men have gained the top, the order ALOFT SAIL LOOSERS ! is given.

When the men are all aloft, the order is given TOGGLE THE BOWLINES ! and the men aloft toggle the *top bowlines* to the buntline toggles in the foot of the sail. The head halliards are then snatched and led along, the downhauls coiled clear for running, hands by the clew garnets ready to ease away, fore and main buntlines and leechlines well overhauled, clew ropes are bent to the spanker, and trysails ready to haul out. Man the head halliards, top bowlines, and clew ropes. At the order LET FALL ! the men run away with the bowlines and head halliards. The courses are let fall, and the gear overhauled so as to hang square from the yard. The top bowlines are out square, the head sails are hoisted taut up, the spanker and trysails hauled out, and the topgallant sails and royals, if aloft, have their buntlines (if any) and clewlines well overhauled.

To shorten sail when loosed to a bowline ?

This is done if a breeze springs up and the ship becomes uneasy under so much canvas.

The light yard men are sometimes sent aloft and the light sails furled.

The downhauls, clew jiggers (or clewlines), buntlines, and brails are manned, the halliards, top bowlines and clew ropes are tended. At the order SHORTEN SAIL ! the bowlines and halliards are let go, the head sails are hauled close down, the square sails are hauled up by the clew jiggers (or clewlines), and buntlines. The spanker and trysails are brailed up ; the buntlines, etc., etc., squared with the yard.

FURL SAILS.

All hands are called "*furl sails*," and if the light sails are

aloft, ALOFT TOPGALLANT AND ROYAL YARD MEN! The topmen then get in the rigging.

ALOFT TOPMEN! the topmen lay aloft and the lower yard men get out on the sheer pole.

ALOFT LOWER YARD MEN! *Keep well into the slings of the yard.* LAY OUT! the men lay out to their places at once, but *do not pick up the sail*, until the order FURL AWAY! then the leeches are passed in, the sail skinned up snugly and tightly, and the gaskets passed square. *Remain out on the yard until the order* LAY IN! when the yards, top and rigging must be cleared as soon as possible; if so ordered, the square yard men alone remain aloft. If in port, the covers are usually put on the fore-and-aft sails.

To furl from a bowline?

Shorten sail the same as before, except that the bunt-lines are *not* left square with the yard, but are hauled *chock up*. The men lay aloft and the sails are furled as before explained.

Loosing and furling with a watch?

If at sea, loosing and furling with a watch, when the order is given, "LAY ALOFT AND LOOSE THE ROYALS!" or any sail. The men stationed there, lay aloft at once and loose the sails without further orders, reporting when ready to "*let fall.*" *Loose the lee yard arm first.*

If furling, they will lay aloft, furl snugly, and lay down without further orders. At sea, furling lines or sea gaskets are always passed around the yard and sail.

In loosing cast off the yard-arm gaskets first, particularly if it is blowing; keep the bunt *fast and up on the yard*, until the yard-arm gaskets are cast off, not only to prevent jamming the yard-arm gaskets, but if the bunt of the sail should fill with wind (and the yard-arms fast) it might rise above and endanger the people on the yards.

What is mending sail?

If the sails have been badly stowed, or if, for any other reason, they require restowing, all hands are called to "*mend sail*." The men lay aloft, in obedience to the orders, as before. The sails are *not let fall*, but the gaskets are cast off and the sails restowed, the bunt whips are slacked a foot or so and the bunt restowed; haul on the bunt whip, and rouse up the sail, then the gaskets are passed afresh—the men laying in and down as before.

What is squaring yards?

Getting the yards perfectly square by the lifts and braces. The square yard men lay aloft at the order. The boatswain, with the assistance of his mates, commences forward and squares the yards by the braces first. He then gets into a boat (which is ready for him) pulls ahead of the ship and squares the yards by the lifts, then pulling around the ship, he sees that all the gear is taut and everything in order outside.

If in a steamer, at sea, or if it is not convenient to send the boatswain ahead in a boat, he usually squares the yards by the lifts, from the end of the jib-boom, and "break of the poop."

REEFING.

When it becomes necessary to reduce sail by reefing, all hands are called to *reef topsails*.

The topsail clewlines, buntlines, and weather topsail braces are manned, hands are by the topsail halliards ready to settle them.

When ready—and at the order CLEAR AWAY THE BOW-LINES! ROUND IN THE WEATHER BRACES! SETTLE AWAY THE TOPSAIL HALLIARDS! CLEW DOWN! the yard is braced in so that the lee topmast rigging will not prevent its being clewed

down to the cap, and also to shiver the weather leech ; the buntlines are hauled up and the clewlines hauled on as the yard comes down. When it is down on the cap, steady the yard by the lee braces, and haul taut the halliards, belay the gear, haul out the reef tackles.

At the order, the booms are triced up, the topmen lay aloft and out on the yard ; face to leeward, take hold of the slack sail and light *out to windward* ; pass the weather earing forward and *over* the yard through the cringle, rousing the reef cringle well up, and expending the reef earing in turns through the cringle and over the yard, except sufficient to secure its end ; then face to windward, and *haul out* to leeward ; hauling the reef-band well taut along the yard, and pass the lee earing in the same manner as the weather one ; when both earings are secured, knot the reef points (or toggle the beackets) hauling the sail well up on top of the yard. A round turn taken with the reef earing *through* the cringle will keep the sail well up on the yard.

Pass the after reef points *clear of the topgallant sheets*, that is, between them and the yard ; and be particular that the reef points are all knotted ; and that the dog's ear (the bight of sail at each yard-arm) is well up on top of the yard.

Lay in, and lay down from aloft at the order ; the buntlines, clewlines, and reef tackles are let go and overhauled. The *lee braces are let go*, the weather ones tended, the halliards manned and the topsails hoisted. When the sail is up to a taut leech, the halliards are belayed, the yards trimmed, the bowlines steadied out, and pipe down.

When the topsails are being hoisted, the men aloft must see the gear well overhauled.

Royals are furled, but topgallant sails are sometimes set over single reefed topsails.

The second and third reefs are taken like the first, and the earings passed the same way. With the close reef, pass the earing in the opposite direction (from forward aft), etc.; the reef band is hauled *up under the yard*; the earing being hauled *close* under; the after points of the reef band being hauled well taut, getting the band as close under the yard as possible.

Before taking a second reef in the topsails, topgallant sails are generally furled.

The mizzen topsail is usually furled when the fore and main are close reefed.

When taking a close reef, it is necessary to ease a little of the topsail sheets, in order to get the earing up snug. After the topsail yard is hoisted clear of the cap, the reef tackles are steadied taut and belayed, to relieve the strain on the earings. Steady taut the topsail lifts, and usually put on preventer braces with a close reef.

How reef a course?

The reef pendants being hooked to their cringles on the leeches of the sail, hook the clew jiggers to the thimble in the upper end of the pendant. The clew garnets, buntlines and leechlines, are manned and the sail hauled up, (sometimes a course is only hauled half up, in reefing). Haul well taut both lifts. Haul out the reef-tackles, slackening the clew garnets to get them well out. Lay aloft at the order, trice up booms and proceed as in taking the first reef in a topsail, being careful to secure every reef point, or toggle the beackets. Lay in and down from aloft, at the order, let go and overhaul the reef-tackles, and set the sail.

How shake or turn a reef out of a topsail?

The reef-tackles and buntlines are hauled taut. The topsail halliards are settled a little, to take the strain off

the leeches of the sail and reef-earring. LAY ALOFT THE QUARTER WATCH! Cast off the reef-points *from* the slings as they lay out, and have the earings ready to ease away when the reef points are all clear. *Ease away the earings together*, let go and overhaul the reef tackles, buntlines, clewlines; tend and *slack* the topgallant sheets; lay in off the yards and down from aloft, at the order. Man the topsail halliards, tend the braces, hoist away the topsails, trim the yards, etc.

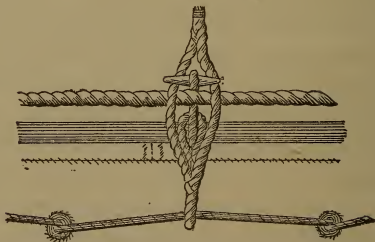
To turn a reef out of a course?

Proceed the same as in a topsail; then ease off the tack and sheet, to relieve the strain on the leeches of the sail, while hauling taut the reef tackles. When ready, ease away the earings, let go and overhaul the gear, haul aboard the tack and haul aft the sheet.

To reef a sail fitted with becket and bull earings?



Bull earring.



Toggle and becket.

What is a bull earring?

An earring composed of two ropes spliced into each

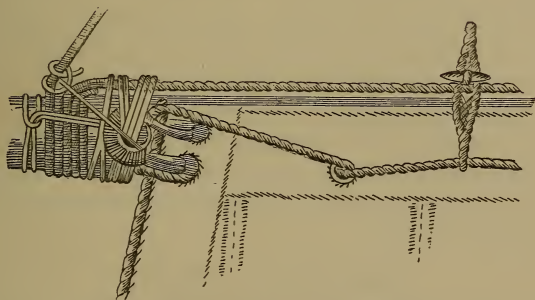
other and marled together forming an eye, which goes over the topsail yard arm. Used for first and second reefs.

To Reef.

As soon as the men are on the yard, the sail is picked up with both hands, until each man has hold of the reef line, then face to leeward, and light the sail out to windward. As soon as the weather earing is passed, face to windward and light the sail out to leeward. As soon as the lee earing is passed, toggle the reef becket and lay in.

To Shake out the Reef.

The reef tackles are hauled taut, and the halliards slacked down a little. The reef becket is untoggled, working from the slings towards the yard-arms, and after they are all clear, the earings are eased down together.



Bull earing passed with riding turn.

To pass a bull earing?

It is rove with a long running eye round the yard-arm, and passed, from aft forward, through the reef cringle; the sail is then hauled well up on top of the yard; then take three turns with the earing, round the yard and up through the cringle, and hitch the end to the lift.

If the first inner turn is taken around the yard, without being passed through the cringle, the sail will keep up better, and the earing can be passed quicker.

To pass the third reef earings?

A turn is taken around the yard-arm, before the lift, over the cleats and through the reef cringle, from aft forward; the sail is hauled well up on top of the yard, then three or four turns are passed around the yard and up through the cringle. The end, after taking a turn round the yard-arm, is hitched to the lift. If the first inner turn is passed around the yard-arm only, it will keep up better. The close reef, as before described, is hauled up *under* the yard, the earing being passed the opposite way.

UNBENDING SAIL.

How is a course unbent?

It is hauled up and furled. Then cast off the robands; secure the buntlines around the body of the sail, at each side of the bunt; pass rope yarn stops around the sail at each seam, or pass the gaskets if they are sewed to the sail; cast off the leechlines, *ease away* the earings, and at the same time lower away the buntlines and clew garnets. When on deck, untoggle the buntlines, unshackle the tacks and sheets, and cast off the gear.

How Unbend a Topsail?

A topsail is unbent in the same manner as a course, except that the sheets and clewlines are unbent aloft. It is sent down by the buntlines, they being hitched or passed around the sail, on each side of the bunt; haul the sail into either gangway, as it is lowered.

At sea, the lee earing should be eased away first, to get it to windward of the stay, then ease away the weather earing

and lower away on the buntlines. In bad weather a line is bent to the lee earing.

In blowing weather, at sea, unbending sails, every man stationed on a yard, before going aloft, should provide himself with a length of rope yarn or spun yarn, sufficient to go twice around the sail. After casting off the robands he passes this stop *twice* around the sail; keep the gaskets fast until the sail is quite ready for easing away. In case the *gaskets* are secured to the head of the sail, they are taken around it, and made fast to their own part, instead of using stops.

CHAPTER XIV.

MAKING AND REDUCING SAIL, ROPES USED, ETC., ETC.—
WORKING STUDDING SAILS—MANŒUVRING, TACKING,
WEARING, ETC., ETC.—GENERAL REMARKS.

What ropes are used in setting a course?

Let go and overhaul leechlines, buntlines, and bunt-whips, *ease down* clew garnets. Haul upon the weather tack and lee sheet, or both sheets.

What ropes are used in setting a topsail?

Let go and overhaul the buntlines and bunt-whips, *ease down* the clewlines. Haul upon the sheets and halliards.

What ropes are used in setting a topgallant sail?

Let go and overhaul the buntlines, clewlines, and bunt-whips. Haul upon the sheets and halliards.

What ropes are used in setting a royal?

Let go and overhaul the clewlines. Haul upon the sheets and halliards.

What ropes are used in setting a jib or staysail?

Let go and overhaul the downhauls. Haul upon the halliards and sheets.

What ropes are used in setting a spanker or trysail?

Let go and overhaul the brails, clew ropes, and head downhauls. Haul upon the outhauls and sheets.

In setting a topsail or topgallant sail, what is hauled home first?

The topsail and topgallant sheets. They are hauled chock home, then the halliards are manned and the yards hoisted. If in good weather, or exercising, sheet home

and hoist away at the same time. The sheets should be marked, to show when chock home.

Which halliards are manned in hoisting a topsail?

At sea, the weather halliards are manned with a few hands to take down the slack of the lee halliards, (a turn should always be taken with the halliards not being hauled upon). In port, the port fore, and starboard main topsail halliards are the ones hauled upon. The mizzen topsail halliards are single, and on the port side of the ship.

When hoisting topsails, always, if possible, pass from one halliards to another, for example; if hauling on the starboard main topsail halliards, when forward on the fore-castle, let go and pass over *on the run* to the fore topsail halliards on the port side (they lead aft); then when abaft the main mast, pass over again to the main, and so on. By this plan no time is lost trying to get aft to man the same halliards, but main topmen assist the fore, and vice versa.

In setting royals, how is the gear hauled on?

Haul home the sheets and hoist away the halliards at the same time.

In setting a jib or staysail, how man the halliards?

A few hands run away with the end, the rest *mass* and stand by to "*tail on*" (catch hold), as the sail goes up. By this plan the sail is hoisted steadily until chock up.

In setting a spanker or trysail, what haul on first?

The head is first hauled chock out, the outhaul or sheet being kept slack until the head is out.

In hoisting yards, what is done with the braces?

They are tended and kept slack.

If the ship is "on a wind" hoisting yards, what is done with the braces?

The lee brace is *let go*, the weather brace is tended and a slight strain kept on it.

In hauling out a spanker, the wind is made to help by easing the boom well over on the lee quarter.

In making sail, never let go the clew garnets or topsail clewlines by the run (altogether), but ease them down.

The hand tending a topsail clewline, must be careful and not let the clew of the topsail get below the lower yard. Should this happen, the sheets are much harder to haul home, as they will bind against the yard, or topmast studding sail-boom.

In hauling home a weather sheet, wait for the *weather roll*, or spill the sail by luffing a little.

At sea, owing to the topgallant yards turning part way over, as the sails fill with wind, the royals are apt to sheet home quite hard; therefore, in setting the royals, hoist about two-thirds up, and then avast hoisting-until the sheets are well home and alike.

When the spanker or trysail is being set, always let go the *weather* vang to take the strain off the gaff; after the sails fill, it can be hauled hand-taut and belayed.

In loosing sail, people in the tops, and on lower yards, must look out for the fall of topsail reef tackle blocks, bridles, etc., etc.

In hauling out a studding sail tack, the wind is made to help, by keeping the ship away (letting her go off).

In making sail, the people aloft must always see the gear well overhauled.

REDUCING SAIL.

What ropes are used in taking in a course?

Ease away the tack and sheet, or both sheets; haul upon the clew garnets, buntlines, and leechlines.

What ropes are used in taking in a topsail?

Ease away the sheets, settle away the halliards, haul upon the clewlines and buntlines.

What ropes are used in taking in a topgallant sail?

Let go the sheets and halliards, and haul upon the clewlines and buntlines.

What ropes are used in taking in a royal?

Let go the sheets and halliards, and haul upon the clewlines.

What ropes are used in taking in a jib or staysail?

Let go the halliards and sheets, haul up the downhaul.

What ropes are used in taking in a spanker or trysail?

Let go the outhauls and sheets, and haul upon the brails

In taking in a sail the object is to "*spill it*" (get the wind out of it); the more wind it holds the more difficult it will be to manage.

If blowing fresh, never let go a lee sheet, but *ease it off*.

In taking in a course, blowing fresh, never let go a tack, but *ease it off*.

In taking in a topgallant sail before the wind, the halliards are let go and the yard clewed down, then the sheets are let go.

In taking in a topgallant sail on the wind, blowing fresh, the lee sheet and halliards are eased off, the clewlines and weather brace hauled upon. The weather sheet is kept fast until the sail is "*spilled*" and the yard down.

In taking in royals on the wind, the weather braces are hauled upon just enough to "*spill*" the sail.

In taking in a trysail or spanker, always haul on the *lee brails best* and spill the wind out of the sail, taking in the slack of the weather brails and vang.

In taking in a jib or staysail, let go the halliards first; the

wind is spilled out of the head of the sail, and it will run half way down the stay of itself; then, by easing off the sheet, the sail is hauled down without straining the stay or boom.

In taking in a course, with the wind aft, the sail is spilled by hauling on the buntlines and leechlines best.

STUDDING SAILS.

These sails are used in light or moderate weather, with the wind free or aft, to increase the speed of a vessel. The weather topmast and topgallant studding sails are not usually set before the wind is two or three points free, or forming an angle of eight or nine points with the keel.

The lower studding sails can only be used, to advantage, with the wind well abaft the beam. With the wind right aft and yards square, studding sails are set on both sides.

To set a topgallant studding sail?

At sea, the sail is kept in the top, up and down the topmast rigging. At the order STAND BY TO SET THE TOPGALLANT STUDDING SAILS! or GET THE TOPGALLANT SAILS READY FOR SETTING! those stationed, lay aloft at once, get a jigger on, and haul taut the topgallant lift, haul taut topgallant and topsail braces on deck. One of the top men lay up on the topsail yard, and converts the boom tricing line into an in-and-out jigger, toggles the heel of the boom to a bull's eye, which travels on a jackstay, fitted for that purpose.

Cast loose the sail in the top, and pass a squilgee strap (which is secured to the yard) around the sail and the studding sail yard, then put the toggle in; man the halliards on deck, also the tack (or man it in the top if it leads there), have a hand by the sheet, man the in-and-out jigger (boom

tricing line) in the top. And at order **HAUL TAUT! RIG OUT! HOIST AWAY!** the studding sail boom is rigged out to the mark on the heel, and a lashing passed securing the heel in place, keeping the boom on the right slue for the tack. As the sail goes up, the slack of the tack is taken in, the men in the top slacking off the line which is attached to the squilgee toggle; when the sail is well above the topsail yard, and at the order **OUT SQUILGEE!** the toggle is hauled out, the sail falls clear, the tack is hauled out, the sail hoisted chock up, and the sheet trimmed down.

To take in a topgallant studding sail?

At the order **STAND BY TO TAKE IN THE TOPGALLANT STUDDING SAIL!** the downhaul and sheet are manned, hands are stationed by the tack and halliards; a hand lays up on the topsail yard ready to cast off the heel lashing, to rig in the boom. At the order **LOWER AWAY! HAUL DOWN! RIG IN!** haul down on the sheet and downhaul, lower away the halliards, ease off the tack and haul the sail into the top; rig in the boom. If necessary, to prevent the sail flying forward of the topgallant sail, ease off the tack before lowering the halliards. *Take the jiggers off the topgallant lifts; make up the sail.*

The fore and main topgallant studding sails, are usually set and taken in together.

To set a topmast studding sail?

At the order "**STAND BY TO SET THE TOPMAST STUDDING SAIL,**" or "**GET THE TOPMAST STUDDING READY FOR SETTING.**" Lay aloft, and get a burton on the topsail yard and haul it well taut. Get the sail out, forward of the fore rigging, and make it up ready for sending aloft. Overhaul down and bend on the halliards and tack, pass a squilgee strap (which is made fast to the yard), around the

sail and halliards, put in the toggle (which has a line bent to it). A hand on the lower yard hooks the in-and-out jigger, for rigging out the boom.

Man the halliards, hands to take in the slack of the tack. And at the order SET TAUT! RIG OUT! HOIST AWAY! The boom is rigged out, by hauling on the in-and-out jigger, the heel being lashed, with the heel lashing, as soon as the boom is out. In the meantime, the sail is being walked up, the man on the lower yard, bearing clear as the sail passes him. When high enough, above the yard, to clear the brace, OUT SQUILGEE! The squilgee is hauled out by a hand on the forecastle, and the sail falls clear. Haul the tack close out, hoist the sail taut up, trim down the sheets. The short sheet, is rove through a bull's-eye on the lower yard and made fast in the top. The long sheet, is dipped down forward of the course to the deck, dip the downhaul down forward of the course, and take it through a leader on the forecastle.

How is the in-and-out jigger rigged?

A small gun tackle purchase, kept on the yard, is used. To rig out, the outer block is secured to the neck of the boom iron, the inner one to the heel of the studding sail boom, the fall is rove through a leading block, at the truss of fore yard, and down on deck. To rig in, secure one block to the slings of the yard and the other to the heel of the boom, the fall leading as before.

To take in a topmast studding sail?

At the order, the downhaul is manned, also the long sheet and in-and-out jigger. Hands stationed by the halliards, tack, and short sheet in the top. At the order, LOWER AWAY! HAUL DOWN! RIG IN! The halliards are lowered and the sail hauled down to the boom by the downhaul;

then let go the tack, haul down on the downhaul and long sheet together, rigging in the boom at the same time. *Take the burton off the topsail yard.* Make up the sail, round up the halliards and hitch them to the clew of the topsail, and stop the tack along the boom. The downhaul and sheets are made up in the sail.

If there is a boom brace on the topmast studding sail boom, it is set taut when the boom is out, and tended when rigging in.

Large vessels sometimes have, as an additional support, a topping lift for topmast studding sail boom.

How rig a jumper on the topmast studding sail boom?

This is done when carrying a topmast studding sail, blowing fresh. The lower studding sail halliards are used; a toggle is placed in the halliards above the boom, and the lower halliards rounded down until this toggle takes in the block in the outer end of the topmast studding sail boom; bring the halliards inboard and belay them *taut*, to some convenient place by the fore rigging.

A jumper on lower yard is usually a water whip; hook it to the yard-arm and to a bolt in the gangway, then set taut and belay.

To set a lower studding sail?

At the order, break out and make up the lower studding sail for setting; overhaul down the outer halliards, and bend them to the yard; overhaul down the boom topping lift, and hook it to the lower boom; hook the inner halliards (use fore clew jigger) to the inner head earing of the sail; bring in and bend on the outhaul to the clew; pass a squilgee strap (which is secured to the yard) around the sail and secure it with a toggle, having a tripping line leading on deck; haul taut the fore lift and brace. At the order, man

the lower boom topping lift and forward guy, have a hand by the after guy, *pull up the inner halliards*, top up and rig out the lower boom. At the order, man the halliards and outhaul. At HOIST AWAY! pull up the outer halliards, taking in the slack of the outhaul and inner halliards; when clear of the topping lift, and about half way up, OUT SQUILGEE! The sail falls clear, walk away with the halliards and walk the sail chock up, *then* haul out the outhaul and pull up the inner halliards; reeve the sheet through a thimble or block on the goose neck of the lower boom, and haul it well taut; trim the lower boom by the fore yard, so that the sail may be set parallel with the foresail.

To take in a lower studding sail?

At the order, man the clewline, sheets, and inner halliards, have hands by the outhaul and outer halliards. At EASE AWAY THE OUTHAUL! CLEW UP! the clewline is hauled on, the outhaul cleared away, and the outer clew hauled up to the yard, then LOWER AWAY! HAUL IN! slack the outer halliards, haul on the inner halliards, clewline, and sheet. When the sail is well in on the forecastle, lower the inner halliards and make the sail up; rig in the lower boom, and trice up the gear.

In setting a topmast studding sail it is hoisted *abaft* the foresail; but in taking it in, it is hauled down *forward* of the foresail.

The lower studding sail is hoisted and hauled in, *abaft* the foresail.

Lower studding sails are sometimes triangular or three-cornered (always so in the merchant service); these are convenient for setting and taking in, and are especially good for night work, as they leave the side lights clear. If blowing fresh, and a three-cornered studding sail is set, a jumper

should be rigged to support the topmast studding sail boom; there being no outer clew to the lower studding sail, it leaves the boom very poorly supported, especially if the topmast studding is pulling hard.

What is meant by "passaree the foresail"?

When the ship is before the wind and lower studding sails set, the clews of the foresail are hauled out by jiggers to the lower booms. This is to present more sail surface, for the wind to act on by spreading out the foot of the foresail.

MANŒUVERING, ETC., ETC.

When is the wind abeam?

When it is eight points from the bow or stern, or at right angles to the keel.

What is running before the wind?

Sailing with the wind exactly aft.

When is the wind on the quarter?

When twelve points from the bow, or four points from the stern.

What is meant by "all in the wind"?

An expression used, when a ship comes so close to the wind as to cause her head sails to shake or be aback.

What is meant by "flat-aback"?

When by shift of wind ahead or other cause, a ship's sails are thrown aback against the masts so as to force her astern.

What is boxing off?

Bracing the head yards around to pay a ship's head off, when she is in the wind or aback.

What is backing and filling?

By working the sails and helm a ship is brought nearly head to the wind, gathering stern board, then causing her to fall off and fill on the same tack, and gathering headway,

the tide carrying the ship in the required direction. This is done in harbors and rivers.

What is "heaving to"?

To bring vessel's head to the wind, and brace the yards, so she will remain nearly stationary.

What is "lying to"?

In a gale of wind a vessel is brought by the wind, and by a proper arrangement of sails, is allowed to come up and fall off two or three points, drifting to leeward.

What is "clawing off"?

Working to windward off a lee shore.

What is scudding?

When a ship runs before the wind, under very short canvas or bare poles.

What is being "brought by the lee"?

When a ship sailing with the wind aft or on the quarter, changes her course so much that she brings the wind on what was the lee side, taking the sails aback, she is "brought by the lee."

What is "broaching to"?

When a ship is sailing with the wind aft or on the quarter, flies suddenly into the wind, throwing everything aback, and thus endangering spars, sails, etc., etc., she has "broached to."

When is a vessel pooped?

When she is running before a heavy sea, and the waves break over the taffrail.

When is a vessel on her beam ends?

When she is heeled over so much that her beams are nearly in a vertical position.

What is the vessel's wake?

The track she leaves in passing through the water.

When is a vessel able to carry the most sail? When the least?

When sailing before the wind—she can carry the least when sailing on the wind.

When the ship is going ahead, if the helm is put to starboard, how will the rudder act?

It will force the ship's stern to starboard, and her head to port.

When the ship is going astern, if the helm is put to starboard, how will the rudder act?

It will force the ship's stern to port, and her head to starboard.

With the wind abeam, and the fore topsail alone set, what effect will it have on the ship?

It will force the ship ahead, and her bow to leeward or away from the wind.

With the wind abeam, and the fore topsail braced aback, what effect will it have on the ship?

It will force the ship astern, and her head to leeward or away from the wind.

With the wind abeam, and the mizzen topsail alone set, what effect will it have on the ship?

It will force the ship ahead, and her stern away from the wind, bringing her bow to windward.

With the wind abeam, and the mizzen topsail braced aback, what effect will it have on the ship?

It will force the ship astern, and her stern away from the wind, bringing her bow to windward.

With the wind abeam, and the main topsail alone set, what effect will it have on the ship?

It will force the ship ahead.

With the wind abeam, and the fore and mizzen topsails alone set, what effect will it have on the ship?

They will balance each other, and force the ship ahead.

With the wind abeam, and all three topsails set, with no rudder, how would you trim the sails to keep the ship away, or force her bow away from the wind?

Shiver the after sail by bracing in the yards (main and cross-jack) so that the wind will strike against the weather leeches and along the surface of the sails, without having any direct pressure on them, thus leaving the fore topsail to send her bow to leeward.

Why brace in the yards on the main as well as those on the mizzen?

Because the sails on the main must be reckoned as acting abaft the centre of rotation, the body of the ship being so much larger forward than aft.

With the wind on the quarter, how trim the sails, if you wish to bring the ship nearer the wind?

Brace up the after yards and set the spanker.

In a steamer, what effect will backing the engines have upon the ship's head?

Backing will always bring the ship's stern up to the wind, and, therefore, throw her head off the wind, or to leeward.

How should sails be set?

As flat as possible, for the force exerted is always at right angles to the part struck.

TACKING.

Meaning of each order given in tacking a ship.

“READY ABOUT, STATIONS FOR STAYS!”—Every one takes his station for tacking ship.

“READY, READY!”—Call on to “stand by.”

“EASE DOWN THE HELM!”—To the quarter-master, who puts the helm down *gradually*.

“HAUL THE SPANKER BOOM AMID-SHIPS!”—The boom is hauled amidships, in order to force the stern to leeward and throw the bow into the wind.

“HELM'S A LEE!”—When the helm is down this order is given; then ease off the fore and head sheets, in order to take the wind out of the head sails as soon as possible. In a light breeze, or tacking against a head sea, the head sails are sometimes hauled down, and are hoisted again as soon as the wind is on the other bow.

“RISE TACKS AND SHEETS!”—The wind being out of the lee clew of the main sail, the clew garnets are pulled up, high enough, to allow the tack and sheet blocks to swing around with the sail, clear of the rail. Shorten in (take in the slack) the lee main tack and weather sheet. The fore tack can be kept fast, and not hauled up until just before the head yards are braced. The weather clew of the foresail will assist in forcing the ship around. Now jump and man the weather main, and lee cross-jack braces; a few hands standing by to run away with the end of the main brace, the others standing by to tail on. Man the lee main tack and weather sheet. Let go and overhaul the weather lifts.

“HAUL TAUT, MAINSAIL HAUL!”—The lee after braces and the after bowlines are let go, the after yards braced around, and the mainsail set on the other tack.

“HEAD BRACES!”—Now jump and man the *head braces*. If the fore tack is down, those stationed at the weather fore clew garnet man it. Man the lee fore tack and weather fore sheet. Rise fore tack.

“HAUL WELL TAUT, LET GO AND HAUL!”—The lee head braces and head bowlines are let go, the head yards braced around, and the foresail set on the other tack.

“HAUT TAUT THE LIFTS, STEADY OUT THE BOWLINES!”
—The weather lower lifts are hauled taut and the bowlines hauled forward.

If a ship does not come up or is sluggish, check a little the lee head braces, bracing up again as she comes around.

Why does the main yard fly around by itself, if hauled before the wind is ahead?

Because the head sails becalm the lee side of the main topsail, but not the weather side, which is aback; and the wind acting only on the weather side will blow that side aft, and force the lee side forward.

Why is a screw ship harder to tack than a sailing vessel?

In tacking, as long as a sailing vessel has headway, the water coming along the weather side of the bottom strikes the rudder and assists to turn the ship; but in a ship with a screw the water meets a constant current coming from the lee side, through the screw hole, caused by the lee way the ship is making, and the side movement of the stern, and is consequently carried off with it to windward, at a considerable angle from the line of keel, without touching the rudder at all.

The rudder, to be of the utmost use, must receive the direct force of the water before the direction of the stream is altered by running through the screw hole.

With yards braced up, which brace has the most strain on it, the weather or lee brace?

The weather brace.

Why should upper yards be braced more “in” than the lower yards, when the ship is on the wind?

The lower yards of a ship are braced up to an angle of about 20° with the fore-and-aft line, but the weather half of the topsail is at a much larger angle on account of the

curvature of the sail. Large sails have more curvature than small ones; a large sail must, therefore, have its yards braced up to a sharper angle than the yards of a small sail, for the plane of both sails to be at the same angle with the fore-and-aft line. And the upper part of a sail, from being attached to the yard, has not so great a curvature as the lower half, therefore the upper yard of the upper sail may be braced in more than the lower yard of the upper sail. If upper yards are braced in more than the lower, and the sails are kept full, it insures the lower sail being well full.

In tacking, if a ship misses stays, what is done?

Either fill away on the same tack, or wear her around on her heel.

Describe in general terms wearing short around after missing stays?

As the ship is falling off, *the head and fore sheets are hauled aft, the mainsail and spanker taken in.* As the wind comes on the bow and shakes the sails, the "*after yards are squared.*" As the wind draws well aft *the after yards are braced up on the other tack, the mainsail is set, and the head yards squared.* When the wind is on the other quarter, the *spanker is set*, shift over the head sheets. When the wind is abeam *brace sharp up*, trim aft the head sheets; be careful not to let the head sails get aback by waiting too long to brace up the head yards.

What is box-hauling?

Putting a ship on the other tack by luffing up into the wind, keeping fast the head sheets, and as she loses her way and comes up head to wind, *haul up mainsail in spanker*, brace abox (aback) the head yards. Square the after yards, and let her head fall off from the wind, trimming the sails as before, until sharp up on the other tack.

What is tacking with a drag?

In a light wind near the land, this is sometimes done: A tow-line is rove through a block at the jib-boom end, and taken aft clear of everything to the weather quarter, where a *drag* is made fast to it; the line is manned inboard, let go the drag when the helm is put down, and haul away on the line at "mainsail haul."

What is club-hauling?

In working or clawing off a lee shore when there is no room to wear, and, therefore, an absolute necessity for going about without missing stays. The *lee* anchor is got ready for letting go, a hawser is bent to it and taken to the lee quarter; proceed as in tacking; if the vessel loses headway and is in danger of missing stays, the lee anchor is let go, and the after yards braced around; haul in on the hawser, veer chain, and when the hawser takes the strain, slip the cable. When the after sails fill, brace around the head yards and cut the hawser. In club-hauling, an anchor is lost.

What is clubbing?

Drifting down a current with an anchor under foot.

Describe wearing a ship?

Mainsail and spanker are taken in, main and mizzen staysails (if set) hauled down. Put the helm up. The *weather main lee cross-jack braces* are manned, *the after bowlines cleared away*. As the ship falls off the after braces are *rounded in gradually*, keeping the sails just lifting until the after yards are square. The head braces are now manned, also fore clew garnets, rise fore tack and sheet, and clear away head bowlines, *square the head yards*; shift over the head sheets when before the wind; as the wind gets on the other quarter, *set mainsail and spanker, brace up the after yards*: as she comes to, brace up the head

yards and trim aft the head sheets. The time to *right the helm* depends upon the ship, care being taken not to let her come into the wind after she is on the other tack. In wearing a short ship the head yards can be swung entirely around, not stopping when square.

If a ship flies into the wind, how will you get her head off?

First, put the helm up and flatten in the head sheets; if that will not do, brace abox the head yards, which will force her head off from the wind.

REMARKS ON EXERCISES, ETC., ETC.

When all hands are called for an exercise or evolution, the crew repair at once to their stations, moving on the run.

Keep perfect silence, pay strict attention to orders, and when given, obey them with a will.

If stationed aloft, do not man the rigging *until ordered*.

When "laying aloft" take hold of *the shrouds*; an imperfect ratline might be met with, and if taken hold of and carried away, you would probably lose your hold and fall from aloft.

Yard men must keep *close in to the slings*, and not lay out until ordered.

When out on the yard do not lay in until ordered.

At the order "LAY DOWN FROM ALOFT!" *leave the top at once*, unless stationed to remain aloft. This order must be *strictly obeyed*, for if not stationed aloft your services are needed on deck; as soon as you reach the deck jump at once to the proper station.

In furling, do not commence to pick up the sail until the order "FURL AWAY!"

In loosing, keep the sail well up on the yard until the order "LET FALL!"

Never "sing out" from aloft. If you want a rope let go, *shake it*.

If stationed aloft, in sending down topgallant and royal yards, stop in the lifts and braces securely before laying down (if checking lines are used, see them well taut), so that the lifts and braces can be hauled taut on deck.

Remember, that an evolution is not complete until all hands are not only clear of the tops, but also clear of the rigging.

In sending paint, tar, etc., aloft, place the pot in a deck bucket, bend on a line from aloft, and haul it up.

In all exercises work lively, and with perfect silence.

Station billets should be taken care of and carefully read, so as to be sure of your proper station.

CHAPTER XV.

EXERCISING SPARS—SHIFTING SAILS.

To send down topgallant and royal yards?

Supposing the yards are across, ready for sea. Cast off or cut yard-arm stops, unbend the gear, single the parrel, unreeve royal sheets, unhook quarter blocks, unhook the foot ropes of topgallant yards, and hook them to the yard forward of the mast, come up the halliards and reeve the long yard rope.

The after or hauling parts of the yard ropes are kept coiled in the top, except when exercising; they are then paid down on deck abaft, and rove through snatch blocks (abaft the masts), ready for use.

The yard rope being hooked to the slings of the yard, is confined to, what will be, the upper quarters, by the lizard. The tripping line is bent to the snorter on the opposite or lower yard-arm, and is led down forward, clear of everything. At the order, man the yard ropes and tripping lines, tend the parrel, lifts, and braces. **STAND BY!** the tripping line (which has been kept into the slings of the yard) is let go and the slack taken in on deck. At, **SWAY!** pull up on the yard ropes until the yards go clear of the cap and hang by the yard ropes, let go the lower lift and tend both braces, at the same time haul down with the tripping lines, clearing the lower yard-arms of the lifts and braces; take a turn with the yard ropes for lowering. At the order, lower away the yards, clearing the upper yard-arm of the lifts and braces, haul down with the tripping lines, bearing the yards clear as they go down, securing them in the lower rigging.

Stop the lifts and braces in, snugly, at the mast head before laying down from aloft.

At sea, the light yards are sent up and down to windward and abaft the lower yards.

In exercising topgallant and royal yards, in port, checking lines for the lifts and braces may be used, by which they are hauled into the mast head, the moment they are clear of the yard-arms.

When exercising, topgallant and royal yards are sometimes *hung* from the forward top rim or from the lower yards; but the evolution is more thorough and complete if the yards are taken in the lower rigging, where they properly belong; particularly in ships with no topgallant fore-castle, like the "training ships."

Tripping lines must be sufficiently well manned to haul off the lower lifts and braces, and guy the yards clear, when coming down. They usually reeve through a tail block, which is tailed to any convenient bolt or cleat, and used as a leader.

For exercising in port, the yard ropes are generally rove through *jack blocks* which are shackled, those for the topgallant yard ropes at the forward part of the funnel, those for the royal yard ropes to the band for the royal rigging. *Jack blocks* are very convenient, for they do away with the necessity of unreeving the yard ropes when exercising topgallant masts.

What are bull ropes?

They are used to aid in getting the upper topgallant yard-arms into the rigging. The upper end has a running eye turned in; the hauling part is led through a bull's eye or leader on the forward swifter, about where the upper yard-arm will come, and taken to the deck. The running eye

is taken up *under* and forward of the lower yard, clear of everything, and as the topgallant yard comes down, it is dropped over the upper yard-arm by a hand stationed on the lower yard or in the top. The bull rope is manned on deck, and as soon as the lower yard-arm is placed outside in the chains, the upper yard-arm is hauled into the rigging and the lashing passed.

Topgallant and royal yards are crossed as described in *Rigging Ship*.

To send down topgallant masts?

The fore and mizzen topgallant mast ropes lead abaft the masts, on the port side. The main, leads in the same way on the starboard side. They are taken through good snatch-blocks, and have a cavil (cleared) near by, to take a turn for lowering.

Unreeve the topgallant and royal yard ropes (if rove through sheaves in the mast.) Come up and overhaul enough of the laniards of the backstays, shrouds, and fore-and-aft stays, to slack the rigging, so that mast can be lifted and the fid taken out; bend or hook a heel rope to the heel of the mast and send it down on deck. At the order, man the mast ropes and heel ropes, SWAY UP! and OUT FID! carefully attending the fore-and-aft stays, take a *good* turn with yard ropes, lower away *together*, when all the fids are out, and *all the masts* ready for lowering.

When the royal sheave hole comes below the topmast cap, pass the lizard.

Lower the mast on deck, forward of the topsail yards; the topmen, aloft, unclamp the forward side of the trestle-trees, as the mast goes down, to clear the topsail yard. The funnel is lashed aloft, if necessary, as is also the royal rigging; stop in the shrouds and backstays to the topmast rigging, and

take down the slack of the fore-and-aft stays ; stop in all the rigging, and if at sea, lash the topgallant masts in the gangway, but if for sundown or other exercise, topgallant masts are usually secured up and down the lower masts.

The heel rope should have sufficient hands on to haul down, and guy the mast clear when coming down.

At sea, topgallant masts are usually sent down abaft and to windward of the topsail yards.

Topgallant masts are sent up as described in *Rigging Ship*.

To rig in the flying jib-boom ?

Reeve the heel rope, bend on a rope's end to the heel, and lead it to the forecastle. The flying jib must be unbent. Come up the rigging, set taut the heel rope, unclamp and rig in ; unreeve the fore royal and flying jib-stays, take off the guys, foot ropes, and martingales, secure the boom in the gangway, and stop in all rigging. If rigging in for exercise, lash the flying jib-boom at the side of the jib-boom, and keep fast the rigging.

To rig in the jib-boom ?

Reeve the jib heel rope, set it taut, taking a turn well aft. Ease up the jumper, guys and back ropes.

Hook the foretopmast staysail halliards to a strap around the jib-boom end, haul them taut, and keep them manned.

Unclamp the heel.

EASE IN ! pulling up the staysail halliards as the boom comes in.

Use the inner studding sail halliards (fore clew jigger), to steady and lift the heel of the boom over the rail.

As the boom comes in, the funnel or band and rigging are stopped up on the fore part of the bowsprit cap.

A jigger on the fore stay is used to steady and lift the

head of the boom, shifting the strap out as the boom comes in, or, if great care is taken, the jib-halliards may be used.

To rig out?

Haul away the heel rope, attend the inner halliards and the jigger. After the boom is pointed and rigged, hook on and attend the staysail halliards, easing away as the boom goes out.

When far enough out, clamp the heel.

Pull up the back ropes and jumpers, bend the jib, rig out the flying jib-boom, and bend the flying jib.

Send up the fore topgallant mast.

To send down a topsail yard?

Unshackle the quarter blocks, securing them to the lower cap.

Unbend the sail from the yard, and haul it into the top; overhaul the buntlines well, and unbend the reef tackles from the sail, but nothing else.

Hang the hauling part of the reef tackles, studding sail halliards and topgallant sheets to the eyes of the lower rigging, to keep them from unreeving at the mast-head, and to have them ready when the yard comes up.

Trice up the fly blocks, unshackle the tye blocks from the yard, and stop them to the cap.

Take the tack blocks off the topgallant studding sail booms, hitching the tack round the strap of the block.

Get the studding sail booms up and down the topmast rigging, using the boom tricing line and topgallant studding sail halliards or clewlines.

Unreeve the topgallant sheets and topsail reef tackle.

Unreeve and knot the ends of the studding sail halliards, and round them up to the mast-head block.

Take the topgallant mast rope, which is rove through its

top block, and make the end fast around the slings of the topsail yard, stopping the bight out to (what will be) the upper quarter, with a strong lashing, so that when the yard is swayed it will hang, up and down, by the mast rope. Hook the top burtons to their respective straps on the yard.

Bend a top bowline to the slings of the yard, as a fore-and-aft guy to clear the jaws, first of the topmast, and afterwards of the top.

Tend the topsail braces and lifts, cast off the parrel on one quarter of the yard; SWAY AWAY! pulling up on the burtons and mast rope, and cock-bill the yard by pulling on one burton and slacking the other.

Unrig the lower yard-arm of the topsail yard on the lower yard, and the upper yard-arm in the topmast rigging or top.

Steady the lower yard-arm well forward, as then the upper yard-arm is kept close to the top for the men working in the topmast rigging or top.

When the rigging is off, keep it clear for going aloft.

Lower the yard on deck—lower yard-arm aft, land it on a mat, swab, or grating, to prevent scoring or digging into the deck.

When ready for sending up the same, or a new yard?

Sway aloft by the mast rope and burtons, bent and hooked as before.

When up and down, rig the yard as before.

Use the bowline bent to the upper quarter, to keep the yard clear of the fore part of the top.

Tend the lifts and braces. SWAY ALOFT!

Cross the yard by slacking the mast rope, and upper burton, and hauling on the lower burton.

Pass the parrel lashing, reeve and secure the lifts as soon as possible.

Reeve the reef-tackles and top gallant sheets.

Replace the studding sail booms, and put on the tack blocks.

Shackle the quarter blocks and the tye blocks.

As soon as the reef tackles are bent, haul out and bend the sail.

In shifting a yard at sea, send it up and down, on the weather side.

After crossing a yard, if the jaws have fallen to leeward, or the yard does not rest fairly on the cap, and consequently does not allow the parrel to be passed taut at once; use a rolling or other tackle, to rouse it over to windward.

In general, exercising sending up and down a topsail yard, the sail would be unbent; and sent down on deck out of the way.

To send down or shift a topmast, leaving the topsail yard aloft?

Send the top gallant studding sails down out of the top. Any ropes or whips that may be wanted, must be kept clear of the topmast rigging, as the masts come down. Come up and hang all the backstays abreast the top.

Send down the top gallant and royal yards and mast, getting them all on deck.

Secure the top gallant and royal rigging and truck, on the topmast cap.

Secure the top gallant studding sail booms, and the bunt of the topsail to the topsail yard. Bend one of the top-bowlines to the centre of the yard. Cast off the parrel on one side, attend the topsail halliards, braces and lifts, haul forward on the bowline.

Let go the reef tackles, and topgallant sheets, and when clear of the lower cap, lower away the halliards. Slack up

the lifts, and lower the topsail yard across the fore part of the top, well forward, lashing it there. Clear away the topmast rigging, backstays and stays. Starting all the laniards, except one fore-and-aft stay, and (if at sea), the weather backstay, these are tended as the mast is swayed.

In the training ships, the jeers must be rove off, and the lower yard untrussed. A fore-and-aft tackle is then hooked to a strap around the yard, from well forward, and the lower yard hauled forward to clear the heel of the topmast. In more modern ships, the truss is so shaped that the topmast can pass down between the legs, and between the yard and lower mast.

A *hawser*, with stout lizard (having two tails) attached, having been rove off through the top block, and live sheave in the topmast, up through the opposite top block, and down on deck, belay it to the forward bits. Use a pendant tackle for a top tackle, and clap it on to the other end of the hawser. **MAN THE TOP TACKLE!** light up the topsail halliards, lifts and all gear that goes to the topmast head.

SWAY UP! OUT FID! and LOWER AWAY! When the topmast cross-trees are about six feet above the lower cap, secure the hawser with a stopper, for surging the topmast to start the cross-trees off the mast-head. See the cap-shore well secure, and all the people clear; take off the stopper, and surge (drop) the topmast, and if the cross-trees still hang, sway up the mast and surge as before. As soon as the masthead is clear, secure the topmast cross-trees and cap on top of the lower cap.

Now pass two tails of the lizard around the topmast below the hounds, taking two round turns with each tail, and then knot them together; hang it with a small rope from the topmast head, to keep it from slipping down, or pass

the lizard through the sheave hole. Come up the top-tackle. Now lower away the topmast (with the hawser) pointing the heel down the scuttle or hatchway, until the head is clear of the lower tressle-trees, bend on the end of a whip, from the lower yard, round the mast-head, and haul forward. When the head is forward the top, SWAY UP! As soon as the heel of the topmast rises above the hatch or scuttle, hook a tackle from aft, to the heel, haul aft on the tackle, lower away, and land the mast on deck.

In sending up.

Man the hawser, and walk the topmast up with the head pointing before the top. Lower the heel down the scuttle or hatchway, slue the mast with the foreside forward, point it through the trestle-trees, and land the heel on deck. Light up all the gear, fid the mast, set up the rigging. Before fidding, if short-handed, belay the hawser, and clap on the top tackle.

Sway up the topsail yard. Fid the topgallant mast, casting off the lashings as the mast goes up

To house topmasts and send down lower yards?

The topgallant mast having been sent down, "*all hands house topmasts and send down lower yards.*" This is sometimes done when steaming head to a strong wind, or when at anchor during a gale, so as to offer less resistance to the wind.

The top pendants, tackles and jeers having been rove and sent aloft, MAN THE TOP TACKLES AND JEERS! if the ship is rolling use thwartship tackles on the lower yards; hook fore-and-aft tackles; single the lower lifts and hook the burtons from the lower cap to the burton straps on the yard.

Come up the topmast rigging and stays, but be careful in

easing the fore-and-aft stays, not to ease more than is absolutely necessary.

The jeers may be taken to the capstan if necessary. Have *seamen or petty officers* to lower.

SWAY UP! the top tackles and *unfid.* The topsail lifts, buntlines and reef tackles must be overhauled and *lighted up*, also the laniards of the topmast rigging. Hang the backstays and halliards aloft from the top, as in swaying up much weight is saved; steady the topsail yard.

The flying jib and jib-booms come in when the topgallant masts and the topmasts come down.

When the top tackles are swayed up, overhaul *all the gear* leading to the topmast head. The gear of the courses must be attended.

The jeers being manned (or taken to the capstan) tend all the gear, and SWAY AWAY! when the trusses and slings are clear; the fids being out, LOWER AWAY! together. Rest the lower yards on casks placed in the nettings, and lash the heel of the topmast about half way down the lower mast.

The topsail yards can be kept in their places or lowered across the top. The former is preferable, for then the lifts can be hauled taut and the yards braced to the wind.

To fid the topmasts and sway up lower yards?

Before starting the top tackles or jeers, all rigging, such as backstays, halliards, etc., etc., should be well overhauled and hung from the top, have jiggers and luffs on the stays and backstays ready for setting up at once. The fore-and-aft stays, topsail lifts, etc., should be overhauled beyond the old nip, so as to leave the masts free for going aloft.

All running gear must be well overhauled.

Reeve off the topgallant mast ropes, and place the masts fair for pointing.

When all ready, MAN THE TOP TACKLE FALLS AND JEER FALLS! SWAY ALOFT! fid the topmasts and set up the rigging, key the trusses, and hook the slings of the lower yards.

Sway up and fid the topgallant masts.

SHIFTING SAILS.

Sails, when split, are taken in and repaired aloft, if possible, if not, then shifted. The new sail is sent up to windward, as the old one goes down to leeward.

If the sail is split so as to be of no further use, it is unbent and sent down at once; if not, it is kept on the ship until the new one is ready.

A reef tackle cringle, or any part of the leech can be repaired aloft by the sailmaker in moderate weather. If carrying studding sails on one side only, the others can be shifted over and set, if anything happens to those in use.

If the jib splits, the fore topmast staysail is set.

If a topsail splits across the head, or, if in turning out a reef, the sail is torn, and it is not convenient to shift it, take the reef in again.

To shift a jib.

Haul the sail down, gather it on the boom and put on good stops.

Unhook the tack lashing or strap, cut the robands, unshackle the jib pendants, and bend a clew rope to the clew for an inhaul.

Overhaul the halliards, hook them, and bend the downhaul to a strap or lashing passed around the head of the sail.

Pull up the halliards, ease away the downhaul, haul in on the clew-rope, hauling the sail inboard.

Shift the halliards, downhaul, and clew-rope from the old

to the new sail, hooking the halliards as before, to a strap or lashing around the head of the jib.

Pull up the halliards until the sail is well clear of the "head rail," haul out on the downhaul, ease away the clew-rope and halliards.

Lower the jib on the boom; hook the tack lashing or strap; shackle the jib pendants; and make fast the robands; shift the halliards and downhaul to the head cringle, mousing the halliards.

Hoist away the sail.

To shift a topsail (by the wind)?

Hook the top burton (for a sail tackle) to a strap made fast to the collar of the topmast stay.

The new sail is in the *weather gangway* ready for bending; it is to go aloft by the sail burton.

The old sail is to be sent down to *leeward* by the buntlines.

The topgallant sail and royal are clewed up.

The topsail is taken in, furled, and unbent.

Unbend the topsail sheets, clewlines, bowlines, reef tackles, robands, and head-earings. Make fast the buntlines around the sail at each side of the bunt; carry the weather head-earing over to leeward, and make it fast to the lee yard-arm of the sail, so the sail will go down clear to leeward.

Lower the sail down the lee side (if possible), having a line bent on to the lee earing, if necessary, to guy the sail down clear.

In case it is not convenient to send the sail down to leeward and forward of the course, send it down to windward *abaft* the new sail; but this will seldom be necessary, and it is *much better* to send the old sail down to leeward, except in heavy weather.

As the old sail is going down, hoist away the sail burton and walk up the new topsail.

HIGH ENOUGH! when the clews are above the top. The yard-arm stops are cut *from the sail*, as it passes the top.

See the turns out of the sail.

Bend the reef tackles, hitch the head-earings to them, and haul out.

Bend the sheets, clewlines, bowlines and buntlines.

Lower the bunt of the sail level with the yard.

When *the forward part of the top is clear of men*, cut the stops in the bunt.

Pass the midship robands first, then head-earings and robands; reeve the first and second reef earings, if bull earings.

Haul home the sheets and set the sail.

To shift a topsail in a gale?

The sail is furled, and before the robands are all cast off, several good stops are passed around it.

The sail is sent down *to windward*, either by the buntlines, or the topgallant yard rope, passed around the body of the sail.

Unbend the gear. Cast off the robands, and keep fast the head earings.

Pass the lee head earing into the top, and rouse the lee side of the sail over to windward; lower the sail clear of the top, to windward, ease away the weather earing, and lower into the weather gangway.

If necessary, a line can be bent to the sail, to guy it down clear.

The new sail can be sent aloft by the topgallant yard rope, sail burton or buntlines.

To shift a course (moderate weather?)

The new sail is made up ready for bending, and is stretched across the deck forward of the mast. The yard-arm jiggers are on the yard ready for hauling out. And the lee lift hauled taut.

The course is hauled up, furled, and unbent. The buntlines are made fast or stopped to the body of the sail at each side of the bunt. Unhook the reef pendants. When all ready, ease away the earings, lower away the buntlines, and overhaul the gear as the sail comes down. All the gear coming down with the sail.

Unbend the gear from the old, and bend it to the new sail, stopping the buntlines and leechlines to the head. Hook the yard-arm jiggers to the first reef cringle, and stop the head earing to it.

MAN THE GEAR! hands light up the tacks and sheets.

SWAY ALOFT! HAUL OUT AND BRING TO!

The yard-arm jiggers are hauled out, leechlines hauled up, the sail bent and reef pendants hooked.

Loose the sail and set it. Shift the yard-arm jiggers.

To shift a course in a gale?

The sail is hauled up and furled; cast off a few robands on the yard, and pass several good stops around the sail. Secure the buntlines around the body of the sail at each side of the bunt, cast off the reef points and earings (if the sail is reefed), leechlines and all the robands, keeping fast the head-earings. Sea gaskets may be used to secure the sail in sending down.

The sail is to be sent down to *windward*.

Pass the lee head-earring into the bunt of the sail, and (assisted by a line from the top if necessary) rouse the lee clew into the body of the sail, and secure it there; have a line from deck made fast to the sail to guy it clear. Ease away to windward, and lower away the sail.

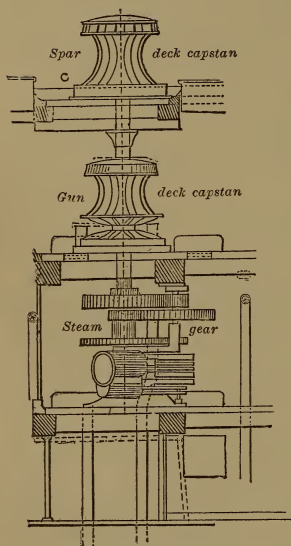
In sending up the sail, send up as before. In addition, the bunt-whip may be hooked to the centre of the head of the sail to assist in swaying aloft. Hook the reef pendants, and reef the sail after bending.

CHAPTER XVI.

CAPSTAN, ANCHORS AND CHAINS.

What is a capstan?

A machine used on board ship for moving heavy weights, such as anchors, etc., etc.



Steam Capstan.

What are the pigeon holes?

The square holes in the drum-head to receive the bars.

What are pawls?

Short bars of iron working on stout pins of iron; they are attached to the sides of the bottom of the capstan.

What are capstans made of?

Wood and iron. Iron capstans are now in general use, and are worked by hand and by the use of steam.

What are the principal parts of a capstan?

The spindle, barrel, drum-head, pigeon-holes, pawls and pawl rim.

What is the spindle?

The shaft on which the capstan revolves.

What is the barrel?

The round, perpendicular part which forms the body.

What is the drum-head?

The circular part on top of the barrel.

What is a pawl rim?

The cast-iron rim secured to the deck around the bottom of the capstan, having notches, in which the lower ends of the pawls fall when the capstan is being hove around. By this arrangement they prevent a backward movement of the capstan.

What are chain whelps?

Ridges of iron in the space at the bottom of the capstan. They prevent the cable from slipping when heaving in.

What are capstan bars?

Large wooden bars, shaped at one end to fit the pigeon holes in the capstan, the other end having a slot in it for the rope, when the bars are swifed in. Capstan bars are used to revolve the capstan when it is worked by hand.

How many capstans have vessels in the navy?

Large vessels have two or more; small vessels have but one.

What is a windlass?

A small capstan, the barrel of which is worked horizontally by levers. It is used on board small vessels, although large vessels ("Trenton") sometimes have steam windlasses.

ANCHORS AND CHAINS.

Parts of, etc., etc.

What is meant by the ground tackle of a ship?

Anchors, chain cables and all gear used in connection with them.

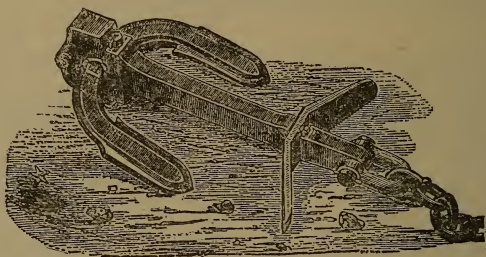
Where are the anchors and chains for the navy made?

At the Washington Navy Yard.

Name some of the anchors in use?

There are many anchors used by sea-faring nations. The Martin anchor is used by the English.

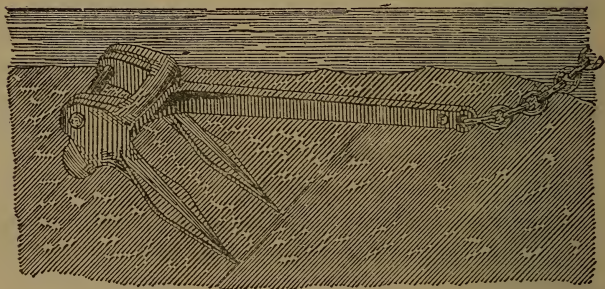
The *Willams anchor*, similar to the *Martin*, is highly spoken of, and many others. In our navy, the American iron-stocked anchor has been found to answer every purpose. (See figs.)



Martin (English) Anchor.

How many kinds of anchors in use in the navy?

Two, the solid anchors and the portable anchors.



Williams (American) Anchor.

What are the solid anchors?

Those having the shank and arms wrought (or made) in one mass.

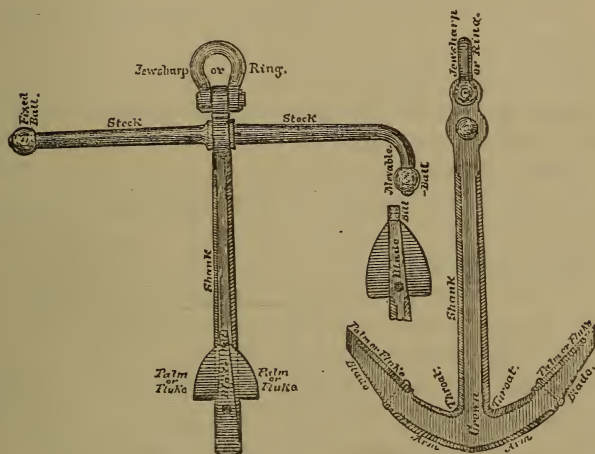
What are the portable anchors?

Those that are made so that they can be taken to pieces.

What are the principal parts of the naval anchor?

The shank, the ring (shackle or jewsharp), the arm, palm (or fluke), the bill (or point), the blade, crown, stock and throat. (See fig.)

American Naval Anchor.



What is the shank?

The perpendicular or long middle piece of the anchor.

What is the ring (shackle or jewsharp)?

The piece bolted to the upper end of the shank, to which the chain is shackled.

What are the arms?

The pieces extending from each side of the lower end of the shank; they form hooks, which bury in the ground (when the anchor is let go), and hold the ship stationary.

What is the palm or fluke?

The broad shield-shape piece on each arm. So made in order to take a good hold on the ground.

What is the blade?

That part of the arm at the back of the palm.

What is the bill?

That part of the arm beyond the palm, (the extreme ends of the arms.)

Therefore each arm is composed of the palm, the blade, and the bill.

What is the crown?

The lower or heavy end of the shank, where the arms are welded on.

What is the throat?

The upper curved part of the arm, where it joins the shank.

What is the stock?

The iron beam placed at right angles to the shank. It runs through a hole in the shank below the ring.

How is the stock secured in its place?

The stock has a shoulder (or swelling) near the middle or half of its length. One end of the stock has a *fixed* iron ball attached; the other end (opposite the shoulder) is bent, for convenience in stowing, and has a movable iron ball attached. The bent end (the ball having been taken off) is put through the hole in the shank, and the stock pushed through until the shoulder takes against the shank. A key or bolt is then put through a hole in the stock, which is on the opposite side of the shank from the shoulder. The ball is then secured to the bent end. The anchor is properly stocked when the bent part of the stock is *in line* with the crown, pointing down.

How are the different anchors of a vessel named?

The bowers, sheets, stream and kedges.

What are the bowers?

The anchors that stow on each bow. All vessels carry two bowers.

What is meant by the best bower?

The *heaviest* bower anchor. It is usually stowed on the starboard side.

What are the sheet anchors?

They formerly stowed, outboard, in the waist or gangway of a vessel. In modern built vessels they stow outboard just forward of the fore rigging; this is more convenient. In the Navy, vessels of over 1500 tons carry two sheet anchors, below 1500 tons they carry but one, which is stowed inboard. Sheet anchors are kept in reserve, to use in case of an accident to the bower anchors, or to use with the bowers in very heavy weather. Sheet and bower anchors are about the same weight.

What is a stream anchor?

It is an anchor about one-quarter the weight of the bower, and is usually stowed below. It is used for heavy work, that is too heavy for a kedge, and not heavy enough for a bower. One stream anchor is supplied each vessel of 500 tons and over.

What are kedges?

Small anchors of different sizes, used for light work, such as warping, kedging, etc., etc. Four kedges are provided very large vessels, but three is the general allowance. The kedges vary in weight, from about 100 to 900 pounds, according to the weight of the bowers.

What is a sea anchor?

A contrivance of triangular form, made of spars, oars, canvass, etc., etc., lashed and secured together. It is used

by vessels and boats to prevent drifting, or to weather a gale. Lieutenant Danenhower of the "Jeanette," with a small boat and exhausted crew, successfully weathered a gale in the Arctic seas, by the intelligent use of a sea anchor.

When a sea-anchor is put overboard, the vessel or boat rides to leeward of it, with a long scope of cable out.

Construct a Sea Anchor.

This anchor may frequently be of the greatest possible use, and may be made in the following manner: Take three spare spars (topgallant studding-sail booms will be sufficiently large), with these form a triangle, the size you think will be large enough, when under water, to hold the ship; cut these spars to the required length, before or after cross-lashing them well at each angle; then make fast your spans, one to each angle, so that they will bear an equal strain when in the water; but should your spars be weak, you should always increase the number of spans accordingly; fill up the centre of the triangle with strong canvas, having eyelet-holes round its sides, about three inches apart, to which eyelet-holes attach the canvas securely to the spars; at the back of the canvas pass many turns of inch or inch and a half rope, net fashion. A proper net would be preferable to rope so expended. To the base of the triangle attach a weight, or small anchor, supported in the centre of the base by a span running from each of the lower angles. To the first mentioned span make fast the stream cable. When everything is quite ready, hoist or put it overboard from the place you think it will answer best. There is every reason to believe that with this anchor under the trough of the sea, and seventy or eighty

fathoms of stream cable out, a ship's drift would not be very great. A triangular form is used in order that the sea may strike lightly on the part near the surface.

What is a mushroom anchor?

The head is shaped like a mushroom or bowl, and it has no stock. Mushroom anchors are used for permanent moorings, and for stationary or permanent buoys, etc.

What is an ice anchor?

It is formed of a bar of iron, bent with a hook in each end, similar to a "*pot-hook*." A hole is cut in the ice and one hook is inserted, the riding hawser is bent to the other hook.

How can you tell the weight of an anchor or kedge?

It is marked on the anchor or kedge. The weight, marked, includes the bending shackle and stock.

CHAIN CABLES.

What cables are used in the Navy for riding cables?

Chain cables. The English are now using *wire cables* in one or two vessels.

How long are chain cables?

Usually from 120 to 135 fathoms long.

What is done with the iron before the chain is made

The best iron is used, each bar is tested, and the links are carefully welded. Experiments, for steel cables, are now being conducted, and, if successful, will greatly reduce the weight and bulk of all chain cables.

How is a chain cable divided?

Into lengths or sections of 15 fathoms each, for convenience in handling and in slipping. These sections are connected by shackles, which will place a shackle at every 15 fathoms of the chain.

In each link of a section, except the two end links, a cast iron stud or bar is inserted; this strengthens them, by keeping the two sides from closing when strained, and also keeps the links from kinking. Each end link of a section, not having the strengthening studs, is made one size larger than the other links.

Why is the stud omitted in the end links?

To leave room for the shackle.

How much strength does a stud add?

About one-fourth.

Which end of the shackle is forward?

The rounded end or crown, for if the pins and lugs, which are at the other end, were forward, they might catch or foul against the bitts or hawse pipes, and check or stop the cable when running out.

What are swivels?

Links in the chain that are fitted to turn in a socket.

Where are they placed, and for what reason?

They are placed at $7\frac{1}{2}$, $37\frac{1}{2}$, $82\frac{1}{2}$, and $127\frac{1}{2}$ fathoms. They are for the purpose of keeping a cable clear of turns and kinks, for example: A vessel lying at anchor, and swinging with the different tides. Were it not for the swivels turning, the cable would soon become full of kinks and turns, and in that way bring an unequal strain on the different links.

What difference is there between the anchor shackle (the one that shackles to the ring), and the chain shackles?

The bolt of the anchor shackle projects beyond the sides (or lugs), and is there secured by a key or pin. The chain shackle bolts do not project beyond the lugs, and are secured by passing a pin through holes in the lugs, to holes in the bolt.

What are shackle-pins made of?

The pins or keys for anchor shackles are of iron. The pins for the chain shackles are usually of hickory or oak.

How are swivels preserved and kept lubricated?

By forming a mixture of white-lead and tallow in the cup.

How are chain cables marked?

There is a shackle at every 15 fathoms. The number of each shackle being plainly marked, in *plain raised* numbers, on the pin end opposite the head, commencing at the shackle nearest the anchor shackle.

Then the swivels will mark the $7\frac{1}{2}$, $32\frac{1}{2}$, $82\frac{1}{2}$, and $127\frac{1}{2}$ fathoms.

What should be done with a cable before placing it on board ship?

It should be carefully tested and proved.

Where are chain cables stowed on board ship, and by whom?

In the chain lockers, by men detailed, called "*chain tierers*."

When bringing a cable off to a ship, in a boat, what end should be stowed first, in the boat?

The end that shackles to the anchor, because it will be the last to come out of the boat.

How are the chain cables named?

The starboard and port bower chains; the starboard and port sheet chains; and the stream chain. They each take their names from the anchors to which they are bent.

What hawse holes do the bower chains lead through?

The two nearest the stem, or the inner ones on each side.

What chain cables lead through the outer hawse holes on both sides?

The sheet chains.

How is the inboard end of a chain secured on board ship?

The end is taken into the chain locker and then rove through a heavy ring bolt, which is secured to the keelson. It is then taken up out of the chain locker and secured, by a strong lashing, to a bolt in the berth deck beams.

Why not shackle the chain to the ring bolt in the locker?

Because, if a ship was riding with all chain out (blowing hard), and it became necessary to slip, it would be impossible to get enough slack chain to unshackle. But when the chain is lashed, clear of the chain locker, the end is easily reached, the lashing cut, and the chain is slipped at once.

What is slipping a chain?

Unshackling or cutting it, and allowing it to run overboard, in order to free a vessel from her anchors.

What is the bitter-end?

The extreme inboard end.

What is the tongue-end?

The end that is shackled to the anchor.

What is the club link?

A peculiar-shaped link (attached to a short section of chain, that is made fast to the anchor) which is shackled to the outboard end of the chain, when the chain is bent. The club link is used so that the chain can be shifted, end for end, when necessary.

CHAPTER XVII.

HANDLING ANCHORS AND CHAINS—MOORING—STATE OF
HAWSE, ETC., ETC.—WARPING AND KEDGING
—CARRYING OUT ANCHORS.

Haw is a chain bent to a bower anchor?

A ring rope is rove through a sheave in the cat-head, under the head gear, and in through the hawse hole. The chain having been roused up out of the chain locker, the ring rope is bent to the fifth or sixth link of the cable with a rolling hitch, and is then securely stopped to the third and first links. The fore bowline can be bent inside to the chain, if necessary, to assist in rousing out. Haul out on the ring rope, and when enough slack chain is out and the cable well up to the cat-head, cut the stop on the first link, and the blacksmith shackles the club link to the chain.

How bend a sheet chain, the anchors being stowed in the waist?

In modern ships the sheet chain is bent the same as the bower, but in the training ships it must be bent to the anchors in the waist.

Rouse up from the locker enough sheet chain for bending purposes (about 30 fms.); and range it on the gun deck clear for running; bend hook ropes to the chain, at intervals, to prevent it running too rapidly.

Hook the top burton to the main yard on the side the chain is to be bent; secure a block at the main mast-head, and one on the main yard in line with the sheet anchor stock.

Reeve, for a ring rope, a small tow line through the mast-head block, from aft forward, through the block on the yard-arm, to a block secured to the stock of the anchor, then through the ring of the anchor, *outside* and *clear* of everything into the sheet hawse pipe, and bend it to the sheet chain in the same manner a bower chain is bent on. Haul away on the towline, rouse out the chain and haul it well up to the anchor, where it is shackled to the club-link; then take the chain, *straight* and *taut*, down to the *elbow bolt*, and pass the lashing. Clap on a deck tackle and haul in the chain, and as it comes out of the water, pass slip ropes, at intervals, around it to hang it for lashing. As it is hauled taut, seize it with good spun yarn stops *underneath* and *to* the bolts, in the ship's side, for that purpose. The chain should then be in a straight line from the elbow lashing to the hawse pipe. Black the chain.

Another way is to reeve the towline through a viol block lashed to the head of the sheet anchor stock; this will do away with the strain on the main yard.

What is a chain hook?

An iron rod with a hook at one end and an eye (or bar) for the hand at the other; it is used to rouse chain about.

What is a hook rope?

A rope with a hook spliced in one end; it is used in handling chain.

What are deck stoppers used for?

For securing a cable when the vessel is at anchor.

What is a deck-stopper?

It is usually made of four-stranded hemp rope or wire rope, about one fathom in length (when fitted). In one end is spliced a hook and thimble, in the other end is formed a man-rope knot; a long laniard, about one-third

the size of the stopper, is attached with an eye, around the stopper, close to the knot. The hook, is to hook in a stopper ring bolt in the deck; the knotted end is placed with the lay of the cable; and the lanyard is passed around the cable and stopper with several turns, leaving about a fathom of the end to worm forward in the lay of the cable beyond the knot, the end being well secured. Deck stoppers are now being fitted with a large toggle, in place of the man-rope knot (with wire rope stoppers), these are neat, convenient, and do not deteriorate.

What is a ring-stopper for the cable?

A piece of rope unlaaid and plaited, whose bight is fastened about a ring in the deck, while the ends are dogged to the cable.

What is a Mix's stopper

Mix's stopper consists of an iron casting like a hawse pipe, set in a strong oak framework, on the after part of the manger. A thick and strong slab of iron, scored out on the under part to admit a vertical link of the chain, moves up and down in a groove, in the after part of the framework, by means of a screw placed vertically over it. This stopper is exceedingly convenient, and is much used; but the ship is never allowed to ride by it.

How to bitt a chain?

Hook a single block (generally a snatch block) to the eye bolt over the bitt head; through this block reeve (or snatch) a hook rope. Now, sufficient slack chain having been roused up, form a cockold's neck with the chain abaft the bitts; so the part leading aft will be on top; and hook the hook rope into the bight thus formed, pull up and drop the bight over the bitt head, so the *cross* will be outside; the after or locker part on top, the forward or riding part

underneath. The chain must be stoppered forward, before bitting.

What is weather bitting a cable?

Taking a double turn with it around the bitt head.

How is a chain unbitted?

A stopper is put on the chain forward of the bitts; the stoppers are taken off abaft the bitts; slack chain is roused up, and the chain lifted off the bitts.

When is a chain bitted?

As soon as the anchor is catted and rung up. It remains bitted when the anchor is let go, and while the vessel is at anchor.

When is a chain unbitted?

When the chain is brought to the capstan, preparatory to heaving up the anchor.

How range a chain cable?

Bend on a hook rope, and rouse up the quantity of chain (out of the locker) that may be required; place it in parallel lines called *fleets* fore-and-aft the deck, between the bitts and chain pipes. *Have the running part, (the part leading to the anchor) outboard, outside of all the other parts,* to avoid violent surging of the chain, which would take place, if the chain swept from outboard in, with a rush.

What is a cat fall?

The purchase by which an anchor is hoisted to the cat-head.

Reeve it?

Bring the cat-block on deck, and place it near the after part of the bill board, with the sheaves corresponding to the sheaves in the cat-head, the *bill of the hook pointing inboard.*

Commence and reeve the end of the cat fall down

through the *forward* sheave of the cat-head, and haul *enough end through to reeve the rest of the fall*. Then continue and reeve the end through the forward sheave of the cat-block, from outboard in; take it (next to the ship's side), *up through, over and down through* the second or middle sheave in the cat-head; then through the middle sheave in the cat-block from *out in*, then *up through, over and down through* the last or after sheave in the cat-head; then through the last sheave in the cat-block, and the standing part is rove through an eye bolt on the after side of the cat-head, and is hitched to a ring bolt on the forecastle, or clinched to the cat-head.

What is a cat-back?

A line secured to the cheek of the cat-block, to aid in handling it.

Reeve it?

The cat-back consists of a fall and two single blocks, one of which is hooked to the neck or inner end of whisker boom, the other being hooked to a bolt in the after part of the stem. The lower end of the fall is fitted with sister-hooks, and is hooked to an eye bolt or span on the forward cheek of the cat-block. The hauling part of the cat-back leads in over the rail to the forecastle. Another one is sometimes hooked to the back or belly part of the hook.

What is the fish-fall used for?

For hauling the anchor up on the bill board.

Reeve it?

The lower fish-block is placed on deck under the fish-boom, the hook of the block pointing aft. The upper or double block is hooked to a bolt on the under side of the fish-boom or davit (the side of the upper block, to which a bull's eye is fitted, must be on the port side). Now com-

mence at the foremast and reeve the end of the fish-fall through a leader hooked about half way up the foremast, then down through a sheave in the end of the fish-boom, and through the *starboard* sheave of the lower fish-block from *aft forward*; then through the starboard sheave of the upper block from *forward aft*, then through the middle sheave of the lower block, to the middle sheave of the upper block, and so on. The standing part passes from the *port* sheave of the lower block up through the bull's eye (on the port side of the upper block), and is secured by hitching the end around the neck of the topping lift bolt.

What is the fish-back ?

A small rope, with a hook at one end, which is attached to the back or belly of the hook of the lower fish-block. It is for convenience in hooking the fish-block to the fluke of the anchor.

What is the ring stopper ?

It is a small chain which passes over a roller (or shoulder) on the forward edge of the cat-head, down and through the ring of the anchor, from forward aft. The last or trip link of the chain goes over a hinged shoulder or tumbler on the after edge of the cat-head. This tumbler is kept in an upright position by means of a trigger extending across the cat-head; the trigger is secured by a small iron pin on the inboard side. The inboard end of the chain is taken in, and *belays* around an iron cleat, which is secured to the cat-tail, or inboard end of the cat-head. When letting go the anchor, take out the pin, the trigger is then knocked clear, the hinged tumbler falls, the link slips off, and permits the ring stopper to slip out of the ring of the anchor.

What is a shank painter ?

A small chain which passing around the shank of an anchor

(near the arms), secures the fluke up on the bill board. One end, is secured with a trigger and tumbler, in the same manner as the ring stopper. The inside end, belays to an *iron cleat* on the water-ways of the forecastle.

Who work the compressors on the berth deck?

The berth deck cooks, in charge of the master-at-arms.

What is "hauling to" the compressor?

Hauling on the tackle (which is attached to the compressor), and checking the chain.

What is "heaving back the compressor?"

Slacking the tackle, and leaving the chain free, by pushing back the arm of compressor.

How is a chain secured when a vessel is at anchor?

The chain is bitted, and two or more (depending on the weather) decked stoppers clapped on the chain, abaft the bitts. The compressor, when the strain is well on the stoppers, is "hailed to."

What is an anchor buoy?

An iron buoy which is attached to, and serves to mark the position of an anchor when down. The top of the port one is sometimes painted red, and the starboard one green, to mark out the anchor.

What is a buoy rope?

The rope that makes fast the buoy to an anchor. It is bent or hitched, securely, to the crown of the anchor.

What is streaming the buoy?

Letting it fall from the forecastle or chains into the water, just before the anchor is let go.

What is meant by a buoy not "watching?"

When it don't float on the surface of the water; this sometimes happens from the buoy rope being too short, or from the buoy leaking. In the former case, the buoy rope

is lengthened ; in the latter case "*bleed the buoy*" (let the water out).

What is a back rope ?

A rope led through a block on the bowsprit, and bent to a mooring buoy, to keep it clear of the stem.

Where is the buoy stowed, when the anchor is catted ?

In the forward part of the fore chains, the buoy rope being coiled down, neatly, near it, clear for running.

Who "bring to" the chain ?

The port watch of fore and main topmen, and quarter gunners.

What is "bringing to" the chain ?

Taking the chain to the capstan ready for heaving in.

How does the chain go on the capstan ?

The bight of the chain is carried to the after part of the capstan ; and that part of the bight, leading to the anchor, is fitted into the space, under the barrel, on the whelps. The chain is taken half way around the capstan, and when it gets to the forward and opposite side, it leads off and passes aft, around one or two vertical friction rollers, (that are placed in sockets in the deck), and thence to the chain pipe and locker.

What other method of connecting a chain to a capstan ?

By using a messenger.

What is a messenger ?

It is either of hemp or of chain, being firmly united (or temporarily secured) to the main or anchor chain by nippers. A hemp messenger is taken around the barrel of the capstan, and after passing around a roller, is made fast to its own part at the hawse hole ; forming an endless (or continuous) rope. A chain messenger works over studs placed on the capstan, and around a roller forward, forming an endless chain, in the same manner as the hemp messenger.

Who rig the capstan?

The Carpenter's gang.

How is the capstan rigged?

The bars are shipped and "swiftered in," the chain is "brought to," and everything is moved clear of the bars and capstan.

What is "swiftering in"?

Steadying the bars, by connecting them with a small line passed *through* and *around* the slots in the end.

Who man the bars, etc., for heaving in?

All hands, unless one watch is required on deck. When the starboard watch remain on deck, the port watch and marines man the bars. The quarter gunners are at the capstan, to keep the chain clear and pay it below; the people stationed at the compressors are at the tackles; the chain tierers are in the lockers. When "all ready," the stoppers are taken off, and at the order, "HEAVE ROUND!" the anchor is hove up to the bows.

What is meant by the chain tending?

It means in what direction, relating to the ship, does the chain lead from the hawse hole, as the chain "*tends broad off the starboard bow.*"

What is meant by "up and down"?

When all the slack chain is hove in, the chain will lead right *up* and *down*, from the hawse hole, to the anchor.

What is short-stay?

When the chain is not quite up and down, and leads *in* a line with the fore topmast stay.

When is an anchor aweigh?

The moment it leaves the ground.

When is an anchor in sight?

As soon as the stock can be seen.

What is a clear anchor? Foul anchor?

A *clear anchor*, is when the chain leads straight, from the anchor shackle, to the hawse hole. A *foul anchor*, is when a chain has one or more turns around the flukes, shank or stock, or when the anchor is caught in some other anchor chain, or a wreck.

When is an anchor up?

When it is up high enough for catting; the capstan is then pawled, and a stopper put on the chain.

What is done at the capstan when the order "hook the cat" is given?

The bars are unshipped *at once*, (be sure the pawls are well down) and preparations made for veering chain. A stopper having been put on the chain forward, the vertical rollers are taken out of their sockets, and, if necessary, a hook rope is made fast to the chain at the capstan, so that when the order "veer chain" is given, the chain can be cleared from the capstan and allowed to run out the hawse hole.

How is an anchor catted?

After an anchor is up, the cat-block (having been overhauled down) is hooked into the ring of the anchor aided by the cat-back; the bill of the hook pointing inboard, so it can be unhooked after the anchor is catted. The slack of the cat-fall is taken in. When all ready, the cat-fall is manned and "WALK AWAY WITH THE CAT;" as soon as a good strain is on the cat fall, "VEER CHAIN;" the stoppers are taken off the chain, the chain knocked or hauled clear of the capstan, and sufficient slack chain run out to allow the anchor to go to the cat-head. The anchor is hoisted to the cat-head, and a turn with the cat is then taken. As soon as the anchor is catted, the ring stopper is passed, as before described.

How fish an anchor?

The fish-boom or davit having been rigged out over the bill-board, the lower block of the fish-fall is overhauled down, and (with the assistance of the fish-back) hooked to the arm of the anchor; the bill of the hook pointing inboard, and resting against the inner part of the after fluke or palm. When all ready, "WALK AWAY WITH THE FISH!" the anchor is hoisted up on the bill-board, and the shank painter is passed, as before described.

What is "ringing up the anchor"?

After the anchor is on the bill-board, and the *shank painter* passed, the cat-fall is unrove; the fish-boom is then shifted over the cat-head, and the lower block of the fish-fall is hooked to the ring of the anchor. The fish-fall is then manned, and the anchor is hoisted close up under the cat-head, the slack of the ring stopper is taken in and secured. The anchor is now ready for letting go. A ring rope is frequently used, reeving it through the sheave of the cat-head, and through the ring of the anchor. This is done if in a hurry to make sail.

How is the chain prepared for letting go?

After ringing up the anchor, the slack chain is hauled inboard, bitted, and all slack chain paid below into the locker; the compressor is then hove back, and everything placed clear of the chain.

How is an anchor secured for sea?

The inner fluke is hoisted well inboard, the slack of the shank painter taken in; extra lashings are passed around the cat-head, and through the ring of the anchor; also around the shank and through a bolt on the forecastle. The bulwarks around the anchor are secured in their places.

How get an anchor off the bows?

Take off the extra lashings, and heave the inner fluke of

the anchor outboard; (with the assistance of an anchor-bar, slacking the shank painter), so that the anchor will slip off the bill-board when the shank painter is let go.

What is an anchor-bar?

A large, iron-shod, oak bar, used in handling anchors.

How is an anchor let go?

The chain being all clear for running, one hand is stationed with a heavy hammer at the trigger, for the ring-stopper, and one hand at the trigger for the shank painter, (generally the captains of the forecastle). At the order "*Let go*," the man at the ring-stopper sings out, *one, two*, (take out preventer pins) *three*; at three, both triggers are struck together; the ring-stopper and shank painter unreeving, the anchor falls into the water.

When is the anchor cock-billed?

When it is not on the bill-board, but is hanging at the cat-head by the ring-stopper.

When is a vessel riding to a single anchor?

When only one anchor is down.

MOORING, STATE OF HAWSE, ETC., ETC.

When is a vessel moored?

When riding to two or more anchors, or when made fast to a dock or wharf.

How is a vessel moored with two anchors?

The first anchor is let go, and twice the amount of chain that it is proposed to ride to is run, or veered out; then the second anchor being let go, the first chain is hove in, at the same time the requisite amount of chain is veered on the second anchor. The chains are secured when both anchors have the proper amount of chain out.

What is a flying-moor?

Letting go both anchors, while having headway, and afterwards equalizing the chain on each.

When is a vessel moored head and stern?

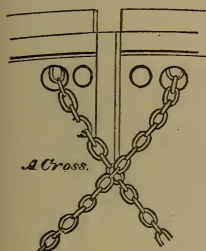
When one cable leads from the hawse-hole, and the other leads aft from the stern.

What is a "clear-hawse"?

A vessel moored, and riding, with the cables clear of each other.

What is an "open hawse"?

A vessel riding with her head in a line between the two anchors; the cables leading out on their respective sides clear of the stem.



What is a "foul-hawse"?

If, by swinging, the cables are brought to bear upon each other, so as to be chafed by the motion of the vessel.

What is a cross in a hawse?

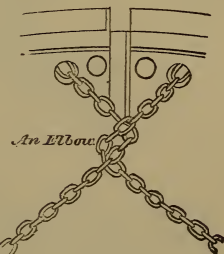
A vessel from a clear hawse swinging half around, or performing a half circle, brings a *cross in the hawse*. If the starboard cable is on top, she must swing to starboard to clear hawse; if the port cable is on top, she must swing to port to clear.

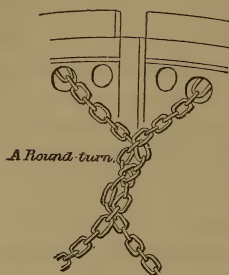
What is an elbow in the hawse?

Having a *cross*, if a vessel swings the wrong way (that is, the same way she did before), and performs a full circle from a clear hawse, it will produce an elbow.

What is a round-turn, etc., etc.?

From an elbow, if a vessel swings again in the wrong direction, it brings a round turn. Another swing will bring a round-turn and elbow, etc.



How is a hawse cleared?

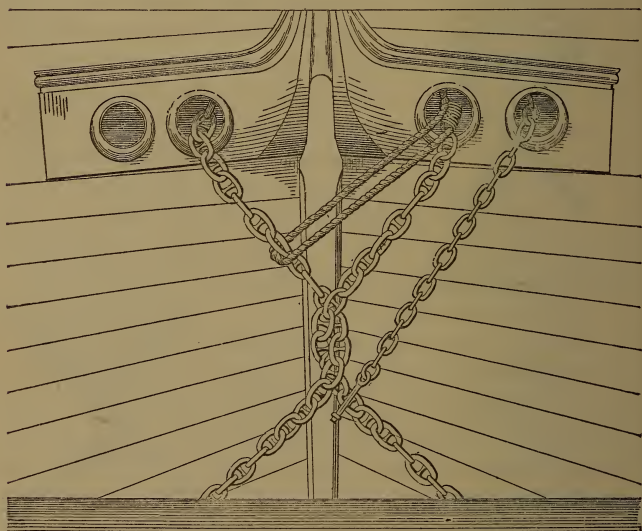
Sometimes, in good weather and smooth water, by towing the ship around, or by winding her around with the spanker; but usually, it is cleared, with the clear hawse gear.

What is clear hawse gear?

The clear hawse pendant, clear hawse rope, deck tackle and devil's claw (or pelican hook or shackle).

How clear hawse, using clear hawse gear?

The cable with the least strain on, is the one to be

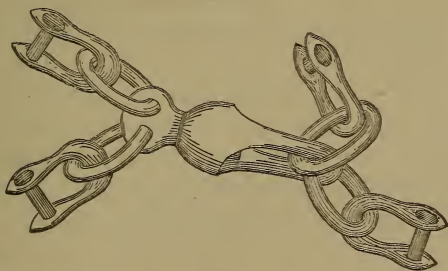


Clearing hawse of an elbow.

handled. Pass the clear hawse pendant out of the sheet hawse pipe, at the side on which the cable is to be cleared, and secure it to the cable *below* the turns, and well down to the water's edge; clap on a deck tackle on the gun deck, and haul until the chain is well slack above where the clear hawse pendant is secured; then pass the hook rope or clear hawse rope outboard, and around the chain, in the opposite way to which the turns are; bring the end back through the hawse pipe, and hook it to the link of the chain inboard (which has already been unshackled for that purpose). Now man the hook rope, and reeving out the short end of the chain, haul the turns clear and shackle on again. For greater security, and in blowy weather, a hawser is used to assist the clear hawse pendant.

What is a mooring swivel?

A swivel with four shackles attached. It is shackled to the cables, and by revolving, prevents the cables fouling.



Mooring Swivel.

How is a mooring swivel put on, the port chain being the slack chain?

When the chain cables are ready for the mooring swivel, the shackles are between the stem and the water. Place the

mooring swivel in a boat, containing the blacksmith, with punches, pins, hammer, etc. Have hands on gun deck with hawse pendant, hawse rope, deck tackle, etc.; pass the hawse pendant out from the sheet pipe, and secure it to the starboard chain or riding chain. Hook deck tackle and bouse well taut, taking off all strain above where the hawse pendant is hooked; now unshackle the chain in the boat, and shackle the upper end to the upper leg of the mooring swivel, taking care to see that the upper part or *cup* of the swivel be uppermost; then shackle the lower leg of swivel to the lower part of the chain. Then heave taut the chain with deck or other tackle, and bitt and secure. When secure, come up the hawse pendant, and pass out on the port side, and proceed in same manner. If necessary, one part of the chain inboard can be sent below. When moored, the swivel should lie clear of the stem and well out of water. Place tallow in cup of swivel for lubricating purposes. The best time to put on a mooring swivel is at slack water: for at that time there is less strain on the cables.

If the swivel is so small that it can pass through the hawse hole, stopper the riding cable inboard, unshackle, put the swivel on and veer it outboard. Then send a boat under the bows and put it on the lee cable, as before explained.

If a cable parts, and the anchor and chain are lost, how are they recovered?

By sweeping or dragging for them. Boats are used, having long lines with grapnels. Let the grapnels rest on the bottom, and drag or sweep across, or at right angles to the direction the anchor and chain is supposed to lie, and the grapnel will probably catch on the chain or anchor.

WARPING AND KEDGING.

What is a warp?

A rope or hawser used to move a ship from one place to another, in a river or harbor.

What is warping a ship?

Moving her from one point to another with warps, which may be attached to other ships, buoys, or fixed points on shore. The ship is moved by hauling on the warps by hand, by applying purchases, or taking the warp to the capstan.

How is a short warp run out quickly?

One boat takes the end and runs away with it, the other boats pull in fore-and-aft under the bights, at equal distances, giving away the moment they get hold.

What is done with the end of a warp in the boat?

Enough end is coiled away forward, to allow plenty of slack to make fast, the moment the boat reaches the proper point.

How is a heavy warp laid out?

It is necessary that the bight be floated—and in case there is a chance of it tautening, hang it outside the boat, instead of laying it fore-and-aft amidships.

What is a guess-warp?

It is judging the distance, by the eye, from the ship to the point to make the warp fast, then coiling sufficient line in the boat to reach that distance.

How are guess-warps run?

If going to lay out a warp to windward, or against the tide, coil the whole of the warp in the boat, pull to the desired point and make the end fast; then pay out with judgment as the boat returns to the ship; do not pay out too quickly, but keep sufficient line to reach the ship. Another way is to coil a part of the warp only in the boat,

which pulls for the "make fast," and commence to pay out from the boat, only, when sure of having sufficient line to reach the "make fast."

What precaution is taken with wet warps?

They require careful seizing to prevent them slipping.

What is done with the end of a hawser if not becketed?

A hitch is put in it, and the end stopped down, to bend on the heaving line.

What is kedging?

It is moving a vessel from one point to another, by means of warps, made fast to kedges.

How is a vessel kedged?

A warp is made fast to a kedge, which is carried out, and let go in the direction the ship is to be moved. The warp is manned and walked in; as the kedge comes home, another is carried out and let go a sufficient distance ahead of the first, and the second is walked in; the first is then weighed, sent ahead, and so on until the desired point is reached. The same appliances are used as for warping, hauling by hand tackles or taking it to the capstan. After warping or kedging, the lines should be triced up to dry, before sending them below.

What precautions are necessary in veering chain in heavy weather?

The compressors are well manned, deck stoppers tended, and, if necessary, a deck tackle is clapped on near the chain pipe, to assist in checking the chain. Only a few fathoms are veered out at a time, in order to prevent the chain taking charge.

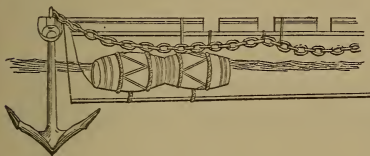
TO CARRY OUT ANCHORS.

There are several excellent methods of carrying out anchors, but as that work is usually directed by an officer,

only three methods are explained. The occasion may arise when the coxswain of a boat will be obliged to superintend the carrying out of a kedge, a stream anchor, or a bower.

How are anchors and kedges carried out?

Usually, by the ships' boats.



To carry out a heavy kedge or a light stream?

Hoist the kedge or stream out by the yard and stay, and lower it into the water astern of

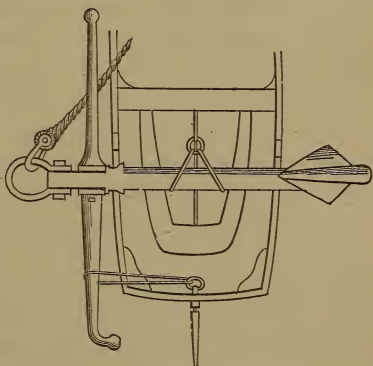
the boat. The coxswain hangs it there by a lashing. One end of the lashing is made fast to the ring bolt in the stern, passed around the shank of the anchor, and the end belayed or made fast for shipping. Bend the hawser to the anchor, and coil it away in the boat; unhook the yard tackle. When the anchor is to be let go, heave the hawser overboard *first*, and then slip the stopper.

A small kedge may be made heavier and more effective by lashing ballast or other convenient weight to it.

To carry out a large stream?

Prepare to receive the stream across the after part of the boat.

Hoist it out by the yard and stay, hooked to the ring. When the crown is below the gunwale of the boat, hang it with a rope from the bottom bolt around the



arms. Lower away, bearing the *stock* over the *opposite* gunwale, roll the anchor aft, and bend the cable to the ring *under* the stock. In this way you can steer, and pull the after oars.

If the anchor is too short for this method, place the mid-ship thwart across the stern, lay two capstan bars fore-and-aft, and land the anchor on this platform, fore-and-aft, with the flukes over the stern.

Heave the cable overboard *first*, when letting go. If necessary, a boat can be made more buoyant by lashing casks under the counter.

To carry out a bower anchor between two boats in shoal water?

It is sometimes necessary to carry out a heavy anchor, in order to warp a sailing vessel away from a dangerous shoal, where a kedge or stream anchor would not be heavy enough; or when a vessel is ashore, and a very heavy heave will be required to pull her off. The following method of carrying out a bower has been found to answer every purpose.

Call away and lower the two largest cutters, or a launch and cutter. Cut adrift two strong-backs from the davits, and pass them into the boats. Forecastlemen rig and top up the fish boom, or rig the fore yard ready for lifting the bower. Fore and main topmen break out, and fake, a large hawser on the gun deck, pointing the end either through the hawse-pipe, bridle port, stern warping chock, or wherever it may be wanted. Haul the two boats forward, and place them abreast of each other, sufficiently far apart to allow the bower anchor to come between them, in a position fair to receive it. Lash the two strongbacks across the gunwales of each boat, about four feet from the bow and stern respectively, each strongback overlapping the

outside gunwales about a foot; two lashings must be passed over each strongback, and around the proper thwarts, close to the outer and inner gunwales of each boat. Should it be found difficult on account of wind, tide, or sea, to keep the boats steady, carry out and drop a kedge, well ahead, for the boats to ride by.

Rig the fish boom (or fore yard) over the bower anchor, hook and mouse the lower block of the fish fall to a stout span, which has been taken through the ring of the anchor and around the arms near the palms, and lash the hook in such a position that the anchor will be lifted squarely.

Now unbend the chain and pass the end of the hawser *under* the after strongback; bring it to the anchor and bend it to the ring. Man the fish-fall, get a good strain on it, cast off the ring stopper and shank painter, pull up and clear the anchor of the bill board and cat-head, and lower it in between the two spars and the boats; lash the ring with a stout lashing to one spar and the crown to the other spar; now slack handsomely the fish-fall, and the anchor will slue and hang with the flues up and down, and the stock athwartships; pay out and coil the hawser, partly, in each boat clear for running. The two boats thus loaded, can be towed out to the proper place, for letting go, by other cutters, a steam launch, or steam cutter; pay out the hawser first from the ship, after which "*pay and go.*" When the hawser is all out, the lashings are cut *together*, and the anchor let go.

In case there is plenty of water around the ship, a better way would be to cock-bill the bower, hook the lower block of the fish-fall to the ring, pull up, cast off the ring stopper, and lower the bower between the boats and spars, and hang it with a lashing passed through the ring and around

both spars. When ready to let go, cut the lashing on one spar.

If blowing fresh and not able to tow the cutters out, send out a kedge, with a long light warp made fast, and warp the two boats out to the proper place for letting go.

In case the anchor is to be run out astern (in shoal water) hang it between the boats with the flukes aft; if to be run out ahead, hang it with the flukes forward.

CHAPTER XVIII.

HOISTING IN AND OUT BOATS—SECURING YARDS FOR HEAVY WEIGHTS.

What is a triatic stay ?

It consists of three parts, two pendants and a span. The pendants have hooks in their upper ends which hook to bolts in the fore and main caps, or are secured around the mast-heads.* In the lower ends of the pendants thimbles are spliced, into which the stay tackles hook. These pendants are spanned together by another rope, the ends of which span are spliced around thimbles which travel on the pendants. The length of the span will be the distance you are to have the pendants apart, viz., the length of the launch. If the boats stow well forward, the long pendant goes forward ; if they stow aft, it goes aft.

Hoist in a launch or other boats ?

In stationing a crew, certain men are detailed for the different stations in hoisting in boats, on the yards, in the tops, etc., etc. When all hands are called to hoist *in or out boats*, these men are to be ready at the ladders to go aloft when ordered. While a portion of the fore and main top men are stationed to clear away the booms for the reception of the boats, or in clearing away the boats to be hoisted out, some of the boats' crews are stationed in the boats to pass out the oars, masts, sails, etc., to haul them alongside, and be in readiness to hook the purchases.

Forecastle men take out their own whip on the fore yard ; they look out for the fore yard tackle, and hook the burton on the fore yard.

* Triatic stays are sometimes secured at the topmast head, especially in long steamers.

Foretopmen overhaul down their burton, send the fall on deck, send down the whip for fore-triatic stay, and look out for the fore stay tackle.

Quarter gunners look out for the main yard tackle, and hook the burton on main yard, etc.

Main topmen send down whip for main-triatic, overhaul down the burton, and send the fall on deck and look out for the main stay tackle.

The mast men see the leading blocks ready.

At the order, LAY ALOFT! the men detailed will lay aloft to their stations, keeping into the slings of the yards. At the order, LAY OUT! the yard men lay out together, taking out the burtons and whips from the tops, securing the tail-blocks of the whip to the lifts, and hooking the burtons to their bolts; standing by to secure the purchase when swayed up to them. The men in the tops send down the hauling and standing part of the whips and the hauling part of the burtons; and from the forward part of the main top, and the after part of the fore top, send down whips for the triatic stay. Bend the whips to the yard-arm tackles, and the top whips to the pendants, hooking and mousing the stay tackles to the thimble ends of the pendants. At the order, MAN THE FORE AND MAIN BRACES, YARD-ARM AND TOP WHIPS! TRICE UP! BRACE IN! the main yard is braced *up*, the fore yard *in*. The braces should be marked at the proper place for belaying. The purchases are whipped up to the yards, and the ends of the triatic pendants to the tops; the yards are then secured and the purchases hooked and moused, being careful to get an *equal strain* on the lifts and burtons. In the meantime the launch has been hauled up, the masts, oars, thwarts, sails, etc., etc., are passed out, and the booms prepared to receive her. The lower blocks of the yard and

stay tackles are hooked to the rings in her stem and stern post, and the hooks *moused*.

The purchase falls lead as follows: The main yard through a snatch block hooked to an eye-bolt in the deck near the main fife-rail and then aft. The main stay leads aft through a block hooked to the deck on the opposite side from the main yard purchase. The fore yard tackle leads through a block hooked by the fore-castle pin-rail and then aft. The fore stay leads forward through a block hooked near the forward end of boat hatch on the opposite side from the fore yard purchase.

Now at the order **MAN THE YARDS!** the men lay in to the tops, the yard purchases are manned, and hands stationed to take in the slack of the stays as the boat comes up. There should be one man in the bow and one man in the stern of the boat. At **WALK AWAY WITH THE YARDS!** the boat is hoisted up. When high enough (the falls should be marked) a turn with the yards is taken, and the stays manned. At **WALK AWAY WITH THE STAYS!** the yard tackles are eased off and the stays walked in until the boat hangs over the chocks, and is hanging by the stays (these falls should be marked also). **LOWER AWAY!** and she is landed on the chocks, the men in the boat overhauling the purchases.

It may be necessary to use a fore-and-aft tackle, to guy the boat clear of the fore-rigging of a sailing vessel, or the smoke-stack of a steamer.

If the boats have any water in them when a little way up, it is customary to *avast hoisting*, and let the water run out.

After the boat is in (or out) the order is given to **LAY OUT!** The men lay out on the lower yards, unhook the burtons, unhook and stand by to send down the yard purchases. The men in the top come up, and stand by to

send down the stay pendants ; hands are stationed by the whips on deck ; then the order is given, **STAND BY TO LOWER AWAY TOGETHER ! HAUL TAUT SQUARE AWAY !** The purchases are lowered on deck, the yards squared, the whips taken off the lifts, and all gear stowed away. When ready, *lay down from aloft, at the order.*

Hoisting out boats will be the reverse of this.

When the yards are properly laid, the braces are hauled taut. Should the weight to be lifted be a very heavy one, and the foreyard at all weak, a water-whip taken to the working yard arm, and *led forward*, is a good precaution, as it will prevent the yard from getting sprung.

SECURING YARDS FOR HEAVY WEIGHTS.

To secure a main yard for ordinary work?

Hook both top burtons on the yard arm that the purchase is to be placed ; then secure the upper block of the purchase on the yard *in between* the two burtons ; haul taut the lifts, braces and burtons, getting an equal strain on lifts and burtons. When ready and hooked on, lead out and man the purchase and hoist away.

To secure a main yard for extra heavy weights?

If necessary, fish the yard with studding sail booms or such light spars as may be convenient ; this will aid in strengthening the yard.

Reeve off the jeer-falls, untruss and lower the yard a few feet, and lash it with good cross lashings to the mast. Hook both top burtons on the yard arm that is to be used ; shift the pendant tackle to the lower cap ; carry the lower block out and hook it on the yard arm to assist the burtons ; top up the yard arm that is to be used.

For a jumper, hook the upper block of a pendant tackle

to a strap passed around the opposite yard arm, about half way out; the lower block of which is hooked on deck, opposite the mast; set taut the tackle and belay. Hook and set taut the rolling tackle on the same side as the jumper.

For a shore, place a stout spar (spare topmast, if possible) from the waterway to the yard arm; lash the head of the spar securely to the yard, and secure the heel to the waterway. Shore up the deck underneath the yard shore.

Lash the thimble end of the winding pendant (allowing about five feet to hang below the yard), with a strong lashing, to the yard arm, *between* the burtons, passing the other end *over* the lower cap (have a mat there to prevent chafe) and make it fast on deck on the opposite side of the mast.

Hook and mouse the purchase to the thimble end of the winding pendant, and lead the fall through a leader lashed on the yard, to a leader at the *top mast* head, then down on deck.

See everything well taut, with an equal strain on burtons, lifts, pendant tackle, etc. etc.

The above is for *very* heavy weights; in hoisting lesser weights, if the purchase fall is led to the topmast head as above described, it takes a good deal of strain off the yard, and the shores can be done away with; and with lesser weights, it may not be necessary to untruss the yard; but in cases of doubt, always untruss. A truss should not be subjected to a very heavy strain.

In using the winding pendant, the lashing on the yard generally binds the pendant to such an extent, that when it gets the strain from the weight to be lifted, there is a violent surging which greatly endangers springing the yard, and stranding the purchase. A good precaution to, in a great degree, lessen the force of this surging, is to first

before lifting the weight, hook the lower block of the yard purchase to some bolt in the-deck, and put strain enough on the tackle to render the pendant through the parts of the lashing.

CHAPTER XIX.

PREPARATIONS FOR SEA—LIFE BUOYS, ETC.—MAN-OVER-BOARD—RULES OF THE ROAD—BELLS TO REGULATE THE MOVEMENTS OF STEAMERS.

What is preparing a vessel for sea ?

Getting her ready, in all departments, for leaving port.

How is a vessel prepared for sea ?

The battery is well secured with extra lashings, muzzle bags put on, and if necessary, the ports are closed. The sails and gear are properly bent, covers taken off fore-and-aft sails, stops of halliards cut, stoppers put on for sheets, halliards, braces, etc., etc., light yards are crossed, and gear bent, everything clear and ready for making and shortening sail, reeve off studding sail gear if ordered. If a steamer, start fires. Put on chafing gear, rig timenoguis, etc., etc., furl awnings, and stow them below. Hoist all boats and secure them for sea ; unship side ladders, rig life boats, see life buoys ready for letting go, take in stern ladders, and rig grab lines from main brace bumpkins ; rig in and secure lower booms, unhook topping lifts and stop them up, unhook boom ladders and pendants and stow them below. Reeve off the cat and fish falls, “ bring to ” the chain and rig the capstan. The log line and time glasses are brought on deck, corrected, and stowed ready for use ; the hand lead lines are placed in the chains or boats and the deep sea or the coasting lead and line are brought on deck. All chests and loose articles around deck are securely lashed, binnacle covers and hatch hoods are placed near

at hand. The ship's draught forward and aft is taken, by the Carpenter, and reported.

What is chafing gear, and where used?

Mats, leather, canvas, battens, etc., etc., put on the horns of the cross trees and jack, on the lower shrouds in wake of the yards, on davits in wake of sheets, etc., etc. Used to protect the sails and rigging from wear and chafe.

What is done with the air ports on lower deck?

They are closed by the Carpenter's gang.

What is done about the health bill and ship's bills?

The health bill is taken on shore, by the Surgeon, and there certified to by the proper authorities. The ship's bills are paid, by the Paymaster, before sailing.

LIFE BUOYS, ETC., ETC.—MAN-OVER-BOARD.

What are life buoys?

Buoys of cork or other material, which are dropped or thrown into the water, to assist a person who has fallen overboard.

What life buoys are used on board vessels of the navy?

Two copper buoys are attached to the stern of a vessel, one on each side. Circular buoys, made of canvas stuffed with cork, are sometimes distributed around the spar deck, and breakers slung with beackets, etc., are also used. Cork jackets are stowed below. On board some vessels small balsas or life-rafts are kept fitted, and ready for launching overboard.

How are the stern buoys let go?

Two handles, similar to bell pulls, are let into the stern bulwarks (from inboard.) One of these handles marked "PORT FIRE," (usually the right hand one) when pulled, fires the match, and at night, must be the first pulled. The other handle is marked "BUOY," and when pulled, the buoy

is detached and drops into the water. The buoy floats with the two copper globes up. On the bottom of the frame is a step for a person to stand on, when supported by the buoy.

When using this buoy, be careful to stand well down on the step, and grasp the upright bar that projects up between the two globes. This plan will keep the head above water ; but if an attempt is made to get on top of the buoy it will certainly capsize.

A good time to practice using a life buoy is during the bathing hour. It can then be dropped and experimented with.

Life buoys are sometimes fitted to fire the match and detach, with one and the same pull.

Which are the life boats?

Usually the two best sea boats at the davits, one on each side, are selected for the purpose ; they are fitted with a detaching apparatus, and kept ready for lowering, day and night ; every thing about them being so fitted, that they can be cast adrift without delay.

MAN-OVER-BOARD.

At the cry of "*Man overboard*," every one should jump at once to his station, and pay careful attention to the orders of the officer-of-the-deck. *Do not run aft and gape over the stern*, but try and remember that the only way to save the man's life is to obey the orders with a will, and get the ship into such a position that the life boat can be lowered quickly, and with safety. If stationed to lower the life boat, don't get excited, but lower carefully and steadily. If stationed at the buoy, don't pull at once, but look over the side and try and drop the buoy as close to the man as possible ; unless it is known that the man fell from the after part of the vessel, when it will be necessary to drop the buoy at

once. A little judgment in dropping a life buoy may save a man's life. If at night be careful to pull the PORT FIRE FIRST, and the buoy pull afterwards, unless they are fitted for one pull.

Persons stationed at life buoys should acquaint themselves at once with the proper working of the buoys, and never pull the "BUOY" until the person overboard is astern of the ship and clear of the buoy; as it is a well-known fact that people, overboard, generally strike out toward the ship, and it is seldom they can be induced to turn the other way; and swim toward a floating object, and away from the vessel.

How are cork jackets used?

They are secured around the chest and body, *under* the arms.

What are balsa's life rafts, etc., etc.?

Wooden or inflated rubber rafts, used when landing in a surf, abandoning ship, etc., etc. As before stated, small balsas are sometimes used for life buoys.

Rules of the road at sea.

The following comparison of the old and of the new regulations to prevent collisions at sea, are given to show the changes made, which it is hoped will soon be legalized by Congress, and adopted for general use. The attention is especially called to those portions of the revised regulations in italics, as it is in them that the changes from the old rules exist.

REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

GENERAL ORDER }
No. 253. }

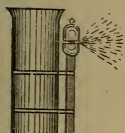
NAVY DEPARTMENT,
WASHINGTON, D. C.,
July 16, 1880.

A revised code of "Regulations for Preventing Collisions

FOG SIGNALS.

STEAM VESSEL.

ONE



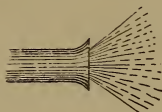
STEAM WHISTLE.

Prolonged Blast
At intervals of not
more than two
minutes.

Steam Vessel
UNDER WAY.

SAILING VESSEL.

ONE BLAST



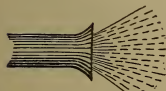
FOG HORN.

At intervals of not
more than two
minutes.

Sailing Vessel
On Starboard Tack.

SAILING VESSEL.

TWO BLASTS

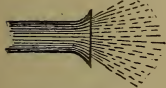


In Succession

At intervals of not
more than two
minutes.

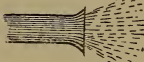
Sailing Vessel
On Port Tack.

FOG HORN.



SAILING VESSEL.

THREE BLASTS

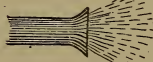
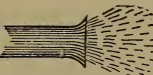


In Succession

At intervals of not
more than two
minutes.

Sailing Vessel

With Wind Aft
the Beam.



FOG HORN.

A BELL

Rung at intervals of not more than two minutes.

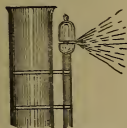
Steam or Sailing Vessel

When NOT under Way



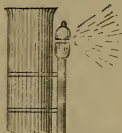
OPTIONAL SIGNALS.

ONE



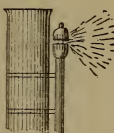
STEAM WHISTLE.

Short Blast:
"I am di-
recting my
course to
starboard."



STEAM WHISTLE.

TWO

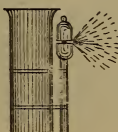
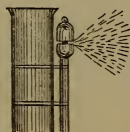


Short Blasts
"I am di-
recting my
course to
port."

THREE

Short Blasts.

"I am going full speed
astern."



STEAM WHISTLE.

at Sea'' having been approved by nearly all maritime nations of the world, and adopted by them, to go into effect on the 1st of September, 1880, thus becoming an integral part of the law of the sea, it is hereby adopted for the naval service of the United States, to go into effect on the above-mentioned date, *in so far as the navigation of naval vessels outside of United States territorial waters is concerned.* Within the waters of the United States, naval vessels will be guided by the regulations for preventing collisions, as specified in Section 4233, of the United States Revised Statutes.

Navy Department General Order No. 34, dated May 4, 1864, and forming appendix No. 2 of the United States Naval Regulations, is hereby rescinded; and the precepts of the Revised Regulations, and of the United States Statutes hereto appended, will be strictly complied with in accordance with the above specifications.

A careful examination and comparison of the appended codes is enjoined upon all officers of the Navy, especially of those parts of the Revised Regulations which are printed in italics, as it is in them that the modifications from the old rules exist.

WM. N. JEFFERS,

Acting Secretary of the Navy.

Section 4233, U. S. Revised Statutes.

RULE I. Every steam-vessel which is under sail, and not under steam, shall be considered a sail-vessel; and every steam-vessel which is under steam, whether under sail or not, shall be considered a steam-vessel.

RULE II. The lights mentioned in the following rules, and no others, shall be carried in all weathers, between sunset and sunrise.

RULE III. All ocean-going steamers, and steamers carrying sail, shall, when under way, carry—

Revised International Regulations.

ARTICLE I. In the following rules every steamship which is under sail and not under steam is to be considered a sailing-ship; and every steamship which is under steam, whether under sail or not, is to be considered a *ship under steam.*

ARTICLE II. The lights mentioned in the following articles, numbered 3, 4, 5, 6, 7, 8, 9, 10, and 11, and no others, shall be carried in all weathers from sunset to sunrise.

ARTICLE III. A sea-going steamship, when under way, shall carry—

(A.) At the foremast-head, a bright white light, of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of twenty points of the compass, and so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side

(B.) On the starboard side, a green light, of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, and so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side.

(C.) On the port side, a red light, of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, and so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, and so fixed as to throw the light from right ahead to two points abaft the beam on the port side.

(D.) The green and red lights shall be fitted with inboard screens, projecting at least three feet forward from the lights, so as to prevent them from being seen across the bow.

RULE IV. Steam-vessels, when towing other vessels, shall carry two bright white mast-head lights vertically, in addition to their side lights, so as to distinguish them from other steam-vessels. Each of these mast-head lights shall be of the same character and construction as the mast-head lights prescribed by Rule three.

RULE V. All steam-vessels, other than ocean-going steamers and steamers carrying sail, shall, when under way, carry on the starboard and port sides lights of the same character and construction and in the same position as are prescribed for side lights by Rule three, except in the case provided in Rule six.

(a.) *On or in front of the foremast, at a height above the hull of not less than 20 feet, and if the breadth of the ship exceeds 20 feet, then at a height above the hull not less than such breadth,* a bright white light, so constructed as to show an uniform and unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the ship, viz., from right ahead to two points abaft the beam on either side, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles.

(b.) On the starboard side, a green light, so constructed as to show an uniform and unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(c.) On the port side, a red light so constructed as to show an uniform and unbroken light over an arc of the horizon of ten points of the compass; so fixed as to throw the light from right ahead to two points abaft the beam on the port side; and of such a character as to be visible, on a dark night, with a clear atmosphere, at a distance of at least two miles.

(d.) The said green and red side lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

ARTICLE IV. A steam-ship, when towing another ship, shall, in addition to her side lights, carry two bright white lights in a vertical line one over the other, *not less than three feet apart*, so as to distinguish her from other steamships. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light which other steamships are required to carry.

(Inland Water Regulation.)

ARTICLE V. *A ship, whether a steam-ship or sailing-ship, when employed*

(New Regulation.)

RULE VI. River steamers navigating waters flowing into the Gulf of Mexico, and their tributaries, shall carry the following lights, namely: One red light on the outboard side of the port smokepipe, and one green light on the outboard side of the starboard smokepipe. Such lights shall show both forward and abeam on their respective sides.

RULE VII. All coasting steam-vessels, and steam-vessels other than ferry-boats and vessels otherwise expressly provided for, navigating the bays, lakes, rivers, or other inland waters of the United States, except those mentioned in Rule six, shall carry the red and green lights, as prescribed for ocean-going steamers; and, in addition thereto, a central range of two white lights; the after light being carried at an elevation of at least fifteen feet above the light at the head of the vessel. The head-light shall be so constructed as to show a good light through twenty points of the compass, namely: from right ahead to two points abaft the beam on either side of the vessel; and the after light so as to show all around the horizon. The lights for ferry-boats shall be regulated by such rules as the board of supervising inspectors of steam-vessels shall prescribe.

RULE VIII. Sail-vessels, under way or being towed, shall carry the same lights as steam-vessels under way, with the exception of the white mast-head lights, which they shall never carry.

either in laying or picking up a telegraph cable, or which, from any accident, is not under command, shall at night carry, in the same position as the white light which steamships are required to carry, and if a steamship in place of that light, three red lights in globular lanterns, each not less than ten inches in diameter, in a vertical line one over the other, not less than three feet apart; and shall by day carry in a vertical line one over the other, not less than three feet apart, in front of but not lower than her foremast head, three black balls or shapes, each two feet in diameter.

These shapes and lights are to be taken by approaching ships as signals that the ship using them is not under command, and cannot therefore get out of the way.

The above ships, when not making any way through the water, shall not carry the side lights, but when making way shall carry them.

(Inland Water Regulation not affecting naval vessels.)

ARTICLE VI. A sailing ship under way, or being towed, shall carry the same lights as are provided by article 3 for a steamship under way, with the exception of the white light, which she shall never carry.

RULE IX. Whenever, as in case of small vessels during bad weather, the green and red lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition, and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side, nor the red light on the starboard side. To make the use of these portable lights more certain and easy, they shall each be painted outside with the color of the light they respectively contain, and shall be provided with suitable screens.

RULE X. All vessels, whether steam-vessels or sail-vessels, when at anchor in roadsteads or fair-ways, shall, between sunset and sunrise, exhibit where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light in a globular lantern of eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken light, visible all around the horizon, and at a distance of at least one mile.

RULE XI. Sailing pilot-vessels shall not carry the lights required for other sailing vessels, but shall carry a white light at the mast-head, visible all around the horizon, and shall also exhibit a flare-up light every fifteen minutes.

(New Regulation.)

RULE XII. Coal boats, trading boats, produce boats, canal boats, oyster boats, fishing boats, rafts, or other water craft, navigating any bay, harbor, or river, by hand-power, horse-power, sail, or by the current of the river, or which shall be anchored or moored in or near the channel or fair-way of any bay, harbor, or river, shall carry one or more good white lights, which shall be placed in such manner as shall be prescribed by the board of supervising inspectors of steam-vessels.

RULE XIII. Open boats shall not be required to carry the side lights required for other vessels, but shall, if they do not carry such lights, carry a lantern having a green slide on one side and a red slide on the other side; and, on the approach of or to other vessels, such lantern shall

ARTICLE VII. Whenever, as in the case of small vessels during bad weather, the green and red side lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for use, and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side.

To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

ARTICLE VIII. A ship, whether a steamship or a sailing ship, *when at anchor*, shall carry, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light in a globular lantern of not less than eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken light, visible all round the horizon at a distance of at least one mile.

ARTICLE IX. A pilot-vessel, *when engaged on her station on pilotage duty*, shall not carry the lights required for other vessels, but shall carry a white light at the mast-head, visible all round the horizon, and shall also exhibit a flare-up light, *or flare-up lights, at short intervals, which shall never exceed fifteen minutes.*

A pilot-vessel, when not engaged on her station on pilotage duty, shall carry lights similar to those of other ships.

(Inland Water Regulation not affecting naval vessels.)

ARTICLE X. (a.) Open fishing boats and other open boats, when under way shall not be obliged to carry the side lights required for other vessels, but every such boat shall, in lieu thereof, have ready at hand a lantern with a green glass on the one side and a red glass on the

be exhibited in sufficient time to prevent collision, and in such a manner that the green light shall not be seen on the port side, nor the red light on the starboard side. Open boats, when at anchor or stationary, shall exhibit a bright white light. They shall not, however, be prevented from using a flare-up, in addition, if considered expedient.

other side, and on the approach of or to other vessels such lantern shall be exhibited, in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

(b.) A fishing vessel and an open boat, when at anchor, shall exhibit a bright white light.

(c.) A fishing vessel, when employed in drift-net fishing shall carry on one of her masts two red lights in a vertical line one over the other, not less than three feet apart.

(d.) A trawler at work shall carry on one of her masts two lights in a vertical line one over the other, not less than three feet apart, the upper light red and the lower green, and shall also either carry the side lights required for other vessels, or, if the side lights cannot be carried, have ready at hand the colored lights, as provided in article 7, or a lantern with a red and a green glass, as described in paragraph (a) of this article.

(e.) Fishing vessels and open boats shall not be prevented from using a flare-up in addition, if they desire to do so.

(f.) The lights mentioned in this article are substituted for those mentioned in the 12th, 13th, and 14th articles of the convention between France and England—scheduled to the British Sea Fisheries Act, 1868.

(g.) All lights required by this article, except side lights, shall be in globular lanterns so constructed as to show all round the horizon.

(New Regulations.)

RULE XIV. The exhibition of any light on board of a vessel of war of the United States may be suspended whenever, in the opinion of the Secretary of the Navy, the commander-in-chief of a squadron, or the commander of a vessel acting singly, the special character of the service may require it.

RULE XV. Whenever there is a fog, or thick weather, whether by day or night, fog-signals shall be used, as follows :

(Rescinded.)

ARTICLE XII. A steamship shall be provided with a steam-whistle or other efficient steam-sound signal, so placed that the sound may not be intercepted by any obstructions, and with an efficient fog-horn to be sounded by a bellows or other mechanical means, and also with an efficient bell. A sailing-ship shall be provided with a similar fog-horn and bell.

In fog, mist, or falling snow, whether by day or night, the signals described in this article shall be used as follows, that is to say :

(A.) Steam-vessels under way shall sound a steam-whistle placed before the funnel, not less than eight feet from the deck, at intervals of not more than one minute.

(B.) Sail-vessels under way shall sound a fog-horn at intervals of not more than five minutes.

(New Regulation.)

(C.) Steam-vessels and sail-vessels, when not under way, shall sound a bell at intervals of not more than five minutes.

(D.) Coal boats, trading boats, produce boats, canal boats, oyster boats, fishing boats, rafts, or other water craft, navigating any bay, harbor, or river, by hand-power, horse-power, sail, or by the current of the river, or anchored or moored in or near the channel or fair-way of any bay, harbor, or river, and not in any port, shall sound a fog-horn, or equivalent signal, which shall make a sound equal to a steam-whistle, at intervals of not more than two minutes.

(See Rule XXI.)

RULE XVI. If two sail-vessels are meeting end on, or nearly end on, so as to involve risk of collision, the helms of both should be put to port, so that each may pass on the port side of the other.

RULE XVII. When two sail-vessels are crossing so as to involve risk of collision, then, if they have the wind on different sides, the vessel with the wind on the port side shall keep out of the way of the vessel with the wind on the starboard side, except in the case in which the vessel with the wind on the port side is close-hauled, and the other vessel free, in which case the latter vessel shall keep out of the way. But if they have the wind on the same side, or if one of them has the wind aft, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.

RULE XVIII. If two vessels under steam are meeting end on, or nearly end on, so as to involve risk of collision, the

(a.) A steamship under way shall make with her steam-whistle, or other steam-sound signal, at intervals of not more than two minutes, a prolonged blast.

(b.) A sailing ship under way shall make with her fog-horn, at intervals of not more than two minutes, *when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession.*

(c.) A steamship and sailing ship, when not under way, shall, at intervals of not more than two minutes, ring the bell.

(Inland Water Regulation not affecting naval vessels)

ARTICLE XIII. Every *ship, whether sailing ship or steamship*, shall, in a fog, mist, or falling snow, go at a moderate speed.

ARTICLE XIV. When two sailing ships are approaching one another so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, viz:

(a.) A ship which is running free shall keep out of the way of a ship which is close-hauled.

(b.) A ship which is close-hauled on the port tack shall keep out of the way of a ship which is close-hauled on the starboard tack.

(c.) When both are running free with the wind on different sides, the ship which has the wind on the port side shall keep out of the way of the other.

(d.) When both are running free with the wind on the same side, the ship which is to windward shall keep out of the way of the ship which is to leeward.

(e.) A ship which has the wind aft shall keep out of the way of the other ship.

ARTICLE XV. If two ships under steam are meeting end on, or nearly end on, so as to involve risk of collision, each shall

helm of both shall be put to port, so that each may pass on the port side of the other.

alter her course to starboard, so that each may pass on the port side of the other.

(Explanatory note.)

RULE XIX. If two vessels under steam are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

RULE XX. If two vessels, one of which is a sail-vessel and the other a steam-vessel, are proceeding in such directions as to involve risk of collision, the steam-vessel shall keep out of the way of the sail-vessel.

RULE XXI. Every steam-vessel, when approaching another vessel, so as to involve risk of collision, shall slacken her speed, or, if necessary, stop and reverse; and every steam-vessel shall, when in a fog, go at a moderate speed.

(Article XIX is an obligatory regulation in United States waters, although not mentioned in the Statutes.)

This article only applies to cases where ships are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two ships which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are, when each of the two ships is end on, or nearly end on, to the other; in other words, to cases in which, by day, each ship sees the masts of the other in a line or nearly in a line with her own; and, by night, to cases in which each ship is in such a position as to see both the side lights of the other.

It does not apply, by day, to cases in which a ship sees another ahead crossing her own course, or, by night, to cases where the red light of one ship is opposed to the red light of the other, or where the green light of one ship is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

ARTICLE XVI. If two ships under steam are crossing so as to involve risk of collision, the ship which has the other on her own starboard side shall keep out of the way of the other.

ARTICLE XVII. If two ships, one of which is a sailing ship and the other a steamship, are proceeding in such directions as to involve risk of collision, the steamship shall keep out of the way of the sailing ship.

ARTICLE XVIII. Every steamship, when approaching another ship so as to involve risk of collision, shall slacken her speed or stop and reverse if necessary.

ARTICLE XIX. *In taking any course authorized or required by these regulations, a steamship under way may indicate that course to any other ship which she has in sight by the following signals on her steam-whistle, viz:*

One short blast to mean "I am directing my course to starboard." Two short blasts to mean "I am directing my course to port." Three short blasts to mean "I am going full speed astern."

The use of these signals is optional; but if they are used the course of the ship must be in accordance with the signal made.

RULE XXII. Every vessel overtaking any other vessel shall keep out of the way of the last-mentioned vessel.

(New Regulation.)

RULE XXIII. Where, by rules seventeen, nineteen, twenty, and twenty-two, one of two vessels shall keep out of the way, the other shall keep her course, subject to the qualifications of rule twenty-four.

RULE XXIV. In construing and obeying these rules, due regard must be had to all dangers of navigation, and to any special circumstances which may exist in any particular case rendering a departure from them necessary in order to avoid immediate danger.

SECTION 4234. * * * and every such vessel (sail-vessel) shall, on the approach of any steam-vessel during the night-time, show a lighted torch upon that point or quarter to which such steam-vessel shall be approaching. * * * * *

(New Regulations.)

ARTICLE XX. *Notwithstanding anything contained in any preceding article, every ship, whether a sailing ship or a steamship, overtaking another, shall keep out of the way of the overtaken ship.*

ARTICLE XXI. *In narrow channels every steamship shall, when it is safe and practicable, keep to that side of the fair-way or mid-channel which lies on the starboard side of such ship.*

ARTICLE XXII. Where, by the above rules, one of two ships is to keep out of the way, *the other shall keep her course.*

ARTICLE XXIII. In obeying and construing these rules, due regard shall be had to all dangers of navigation, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

ARTICLE XI. A ship which is being overtaken by another shall show from her stern to such last mentioned ship *a white light or a flare-up light.*

ARTICLE XXIV. *Nothing in these rules shall exonerate any ship, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.*

ARTICLE XXV. *Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland navigation.*

ARTICLE XXVI. *Nothing in these rules shall interfere with the operation of any special rules made by the government of any nation with respect to additional station and signal lights for two or more ships of war, or for ships sailing under convoy.*

NOTE.—Paragraphs (c), (d), (e), (f), and (g) of Article X are suspended until September 1, 1881, in order to permit a knowledge of them to be circulated among all vessels which they affect.

SPECIAL INSTRUCTIONS.

In construing and obeying these rules, due regard must be had to all dangers of navigation, and to any special

circumstances which may exist in any particular case, rendering a departure from them necessary, in order to avoid immediate danger.

Sailing-vessels to be furnished with signal lights and to show torches.

Collectors or other chief officers of the customs shall require all sail-vessels to be furnished with proper signal-lights; and every such vessel shall, on the approach of any steam-vessel during the night-time, *show a lighted torch* upon that point or quarter to which such steam-vessel shall be approaching.

ADDITIONAL RULES.

These additional rules (found in the proceedings of the Board of Supervising Inspectors of Steam-Vessels and Decisions of Treasury Department) are published for the information of all concerned :

Lights for ferry-boats.

All double-ended ferry-boats on lakes and seaboard shall carry a central range of clear, bright, white lights, showing all around the horizon, placed at equal altitudes forward and aft ; also such side-lights as specified in Section 4233 of the Revised Statutes, Rule 3, paragraphs *b* and *c*. Local inspectors, in districts having ferry-boats, shall, whenever the safety of navigation may require, designate for each line of such boats a certain light, white or colored, which shall show all around the horizon, to designate and distinguish such lines from each other, which lights shall be carried on a flag-staff amidships, fifteen feet above the white range-lights. * * * The signal-lights on ferry-boats, on waters flowing into the Gulf of Mexico and their tributaries, shall be the same as those on all other steamboats on the same waters, except double-ended ferry-boats, which

shall be governed by the rule governing double-ended ferry-boats on lakes and seaboard.

Lights on small craft.

All coal-boats, trading-boats, produce-boats, canal-boats, oyster-boats, fishing-boats, and other water craft, navigating any bay, harbor, or river, propelled by hand-power, horse-power, sail, or by the current of the river, or which shall be moored in or near the channel or fair-way of any bay, harbor, or river, shall carry one bright white light forward, not less than six feet above the rail or deck.

Rafts of one crib, and not more than two in length, shall carry one bright white light, on a pole not less than six feet high; three or more cribs in length, shall carry one white light at each end of the raft at the same height.

Rafts of more than one crib abreast shall carry one white light on each outside corner of the raft, making four lights in all.

Row-boats shall carry one white light two feet above the stem.

It is *recommended* by the Board of Supervising Inspectors of Steam Vessels that, whenever there is a fog by day or night, sailing-vessels and every craft propelled by sails upon the oceans, lakes, and rivers, when on the starboard tack, shall sound, with intervals of not more than two minutes, one blast of the fog-horn; when on the port tack, two blasts; when with the wind free or running large, three blasts; and that, when lying to or at anchor, they shall sound the bell with the same intervals.

Fog-horns.

Any instrument or device for this purpose, which produces a sound equivalent to that of a steam-whistle, will be considered sufficient for the purposes of the law.

The various tows of barges passing up and down Long Island Sound frequently carry lights as follows: The steamer towing (in addition to her side lights) and all the barges but the *last one*, carry two white lights, one above the other, the rear barge in the tow carrying but one. Although there is no law authorizing this, it seems an excellent idea and a very necessary precaution, as the tows are quite long, and it will prevent them being broken in upon. A vessel coming suddenly upon them in thick weather, and seeing two lights, would naturally know there must be something following.

AID TO MEMORY, IN FOUR VERSES, BY THOMAS GRAY. -
(RULES OF THE ROAD AT SEA.)

1. *Two Steamers Meeting.*

When both side lights you see ahead,
Port your helm, and show your red.

2. *Two Steamers Passing.*

Green to green, or red to red,
Perfect safety—Go ahead!

3. *Two Steamers Crossing.*

If to your starboard *red* appear,
It is your duty to keep clear,
To act as judgment says is proper,
To port—or starboard—back—or stop her.

But when upon your *port* is seen
A steamer starboard light of *green*,
There's not so much for you to do,
For *green to port* keeps clear of you.

4. *All ships must keep a bright lookout. Steamers must stop and go astern if necessary.*

Both in safety and in doubt,
Always keep a good lookout:
In danger, with no room to turn,
Ease her!—stop her!—go astern!

CHANNEL BUOYS, ETC., FOR THE WATERS OF THE UNITED
STATES AND CANADA.

Buoys are placed in the harbors, and numbered with reference to vessels *leaving* the harbor; that is, No. 1 buoy nearest the head of the channel, then No. 2, etc., etc., the highest number nearest the mouth of the channel, with the *red buoys* and *even numbers* on the port hand, and the black buoys and odd numbers on the starboard hand, *passing out the channel to seaward*.

1. In approaching the channel, etc., from seaward, *red buoys* with even numbers will be found on the *starboard* side of the channel, and must be left on the *starboard* hand when passing in.

2. In approaching the channel, etc., from seaward, *black buoys* with odd numbers, will be found on the *port* side of the channel, and must be left on the *port* hand when passing in.

3. *Buoys* painted with *red* and *black stripes* will be found on obstructions, with channel-ways on either side of them, and may be left on either hand when passing in.

4. Buoys painted with *white* and *black perpendicular stripes* will be found in *mid-channel*, and must be passed close to avoid danger.

All other distinguishing marks will be in addition to the foregoing, and may be employed to mark particular spots.

Perches with balls, cages, etc., will, when placed, be at turning points, the color and number indicating on which side they shall be passed.

Vessels approaching and passing "light vessels" in the United States, will be warned of their proximity by the alternate ringing of a bell and sounding of a fog-horn on board the "light ship," at intervals, not exceeding five minutes.

BELLS REGULATING THE MOVEMENTS OF MEN-OF-WAR
STEAMERS.

The bell is pulled from the bridge on deck, and strikes in the engine-room, as follows:

- 1 bell—go ahead slow.
- 2 bells—stop.
- 3 bells—back.
- 4 bells—go ahead full speed.

Merchant steamers have a different system of bells. On board merchant steamers, and in the English and other navies, the system of bells is being superseded by an "Indicator." This consists of a dial having a pointer attached, and with the "go ahead slow," "back," etc., etc., printed on the face. It is placed on deck or on the bridge. There is a corresponding "Indicator" in the engine-room. The pilot or officer-of-the-deck, for example, moves the pointer of the Indicator on deck to "go ahead slow;" this strikes a bell and attracts attention to the Indicator in the engine-room, the pointer, of which, has been moved to a corresponding point, at the same instant that the one on deck was moved.

CHAPTER XX.

CAUTIONARY WEATHER SIGNALS—VESSELS ASHORE—MANAGEMENT OF OPEN BOATS IN A SURF—INSTRUCTIONS FOR SAVING LIFE WHEN SWIMMING—DIRECTIONS FOR RESTORING THE APPARENTLY DROWNED.

UNITED STATES SIGNAL SERVICE STATION AT LIFE-SAVING STATIONS.

THE following flag, shown over any station number flags, will be used to designate a full signal station of the United States, from which any communication received will be transmitted by telegraph to destination. This flag will always be hoisted above the station number flags when the station number of such full station is shown as No. 8.



No. 8.



*Signal Service Flag,
Distinctive.*

Any message signalled by the International Code, as adopted or used by England, France, America, Denmark, Holland, Sweden and Norway, Russia, Greece, Italy, Germany, Austria, Spain, Portugal and Brazil, received at these telegraphic Signal Stations, will be transmitted and delivered to the address on payment, either at the Station or at place to which addressed of the telegraphic charge. All messages received from or addressed to the War, Navy, Treasury, State, Interior, or

other official department at Washington, are telegraphed without charge.

Ships' official numbers, shown and recognized at stations thus designated, are reported to Washington by telegraph.

The flag flown below the United States national colors indicates a full signal station connecting by telegraph, but not a Life-Saving Station.

General messages to be telegraphed will be taken only at stations flying either three flags, as first given above, or the American flag with the Distinctive "Signal Service Flag," as above stated.

The Distinctive Signal Service flag flown ALONE indicates a United States Signal Service station anywhere, not necessarily, however, connecting by telegraph.

From and after January 1, 1878, an additional Cautionary Storm Signal will be displayed, as occasion may require, at all active Signal and Display stations of the Signal Service. The signal will be displayed at and on the regular place and staff, and will consist of *a white flag with a square black centre*, shown above *a red flag with a square black centre* by day, or a *white light* shown above a *red light* by night. This signal will be known as the "CAUTIONARY OFF-SHORE SIGNAL," and will indicate, when shown, that while the storm disturbance is considered, at the office of the Chief Signal Officer, as not yet passed for the port or place at which the signal is displayed, and the winds may yet be high, and there may be danger, the winds are expected to blow from a northern or western direction, or "off-shore," at or near the port or place where the signal may be.

The display of this signal will often follow, and must be distinguished from the display of the usual "Cautionary

Signal," *i. e.* a square red flag with a square black centre by day, or a red light shown at night—which retains, whenever shown alone, its usual meaning. The display of either signal is always cautionary.

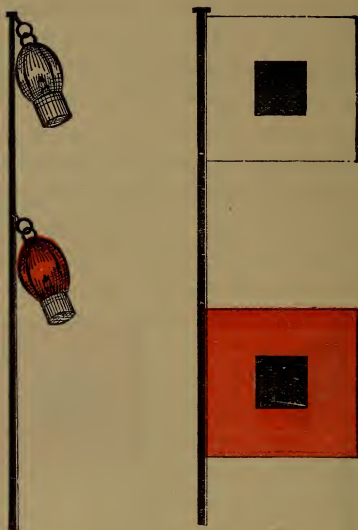
The "CAUTIONARY SIGNAL," *i. e.* a red flag with black square in the centre by day, or a red light by night, calls for caution in view of an approaching storm, and is so "CAUTIONARY" WITH REFERENCE TO WINDS BLOWING FROM ANY DIRECTION.



THE CAUTIONARY SIGNAL.

Cautionary against Approaching Storm, and against Winds from any direction.

The CAUTIONARY OFF-SHORE SIGNAL, *i. e.*, a white flag with black square in the centre, shown above a red flag with black square in the centre, by day, or a white light shown above a red light by night, is "CAUTIONARY" WITH REFERENCE TO WINDS EXPECTED TO BLOW FROM A NORTHERN OR WESTERN DIRECTION, OR OFF-SHORE, AT OR NEAR THE PLACE AT WHICH IT MAY BE.



THE CAUTIONARY OFF-SHORE SIGNAL.

Cautionary against Rough Weather, and against Winds expected to be in a Northern or Western direction or "Off-Shore."

The display of cautionary signals by flags by day and lights by night, is made on occasions of supposed especial danger, at the following points, ports, and harbors:

THE ATLANTIC COAST.

Atlantic City, N. J., Baltimore, Md., Barnegat, N. J., Booth Bay, Me., Boston, Mass., Cape Hatteras, N. C., Cape Henry, Va., Cape Lookout, N. C., Cape May, N. J., Charleston, S. C., Chatham, Mass., City Island, N. Y., Deer Island, Me., Fort Macon, N. C., Gloucester, Mass., Highland Light, Mass., Hyannis, Mass., Jacksonville, Fla.,

Key West, Fla., Kittyhawk, N. C., Lewes, Del., Marblehead, Mass., New Bedford, Mass., Newburyport, Mass., New Haven, Conn., New London, Conn., Newport, R. I., New York City, Norfolk, Va., Portland, Me., Portsmouth, N. H., Rockland, Me., Sandy Hook, N. J., Savannah, Ga., Smithville, N. C., Stonington, Conn., Thatcher's Islands, Mass., Tybee Islands, Ga., Wilmington, N. C., Wood's Hole, Mass.

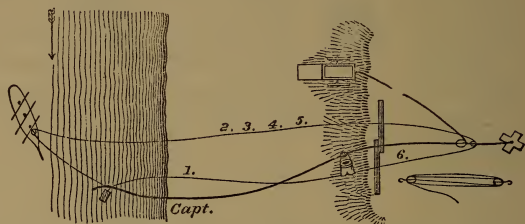
THE GULF COAST.

Galveston, Texas, Indianola, Texas, Mobile, Ala., New Orleans, La., Pensacola, Fla., Port Eads, La., St. Mark's, Fla.

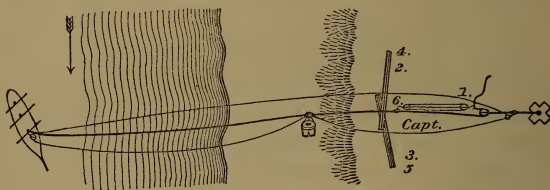
VESSELS ASHORE.

In case of a vessel stranding near a life-saving station on our coast, keep a bright lookout for a line, which, after their attention has been attracted by the signals of distress, the life-saving crew will attempt to throw across the wreck, by firing a shot (with the line attached) from a mortar. Having secured the line, and at a signal from the shore, haul it on board until a tail block with a whip rove off is reached; attached to this block is a metal tag with the necessary directions printed on it (in several languages), how and where to secure the block; after securing the block, cast off the line. A large hawser will then be hauled on board, by the people on shore, using this whip. When the hawser reaches the wreck, it must be secured on board well up on a mast, if possible; the other, or shore end will be properly secured on shore, and communication made by means of a "breeches-buoy" or sort of chair, which is attached to the hawser, and is "hailed out" and "ashore" by the same whip which carried out the hawser.

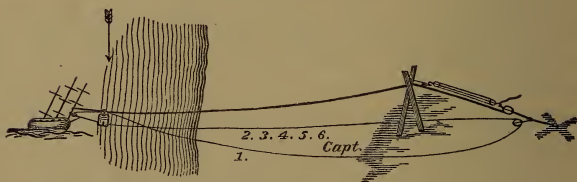
The figures will illustrate the manner of "hauling off the hawser" and establishing the communication.



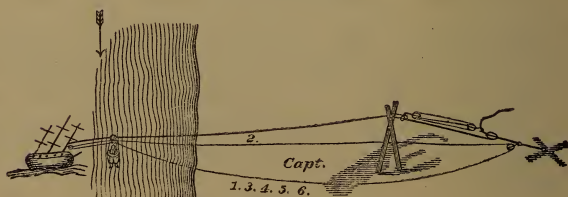
Hauling off the hawser.



Raising the Crotch.



Hauling Out.



Hauling Ashore.

If stranded on the coasts of England or the United Kingdom, communication will be established in a similar manner; instead of firing a shot, a rocket, with line attached, will be thrown across the vessel; to this line a tail block, with whip rove off, is attached, as before described.

RULES FOR THE MANAGEMENT OF OPEN ROW-BOATS IN A SURF—BEACHING THEM, ETC.

RULES OF MANAGEMENT.

I. *In rowing to Seaward.*

As a general rule, speed must be given to a boat rowing against a heavy surf. Indeed, under some circumstances, her safety will depend on the utmost possible speed being attained on meeting a sea. For if the sea be really heavy, and the wind blowing a hard, on-shore gale, it can only be by the utmost exertions of the crew that any headway can be made. The great danger then is, that an approaching heavy sea may carry the boat away on its front, and turn it broadside on, or up-end it, either effect being immediately fatal. A boat's only chance in such a case is to obtain such way as shall enable her to pass, end on, through the crest of the sea, and leave it as soon as possible behind her. Of course, if there be a rather heavy surf, but no wind, or the wind off shore, and opposed to the surf, as is often the case, a boat might be propelled so rapidly through it that her bow would fall more suddenly and heavily after topping the sea than if her way had been checked; and it may, therefore, only be when the sea is of such magnitude, and the boat of such a character, that there may be chance of the former carrying her back before it, that full speed should be given to her.

It may also happen that, by careful management under such circumstances, a boat may be made to avoid the sea, so that each wave may break ahead of her, which may be the only chance of safety in a small boat ; but if the shore be flat, and the broken water extend to a great distance from it, this will often be impossible.

The following general rules for rowing to seaward may, therefore, be relied on :

1. If sufficient command can be kept over a boat by the skill of those on board her, avoid or "dodge" the sea, if possible, so as not to meet it at the moment of its breaking or curling over.

2. Against a head gale and heavy surf, get all possible speed on a boat on the approach of every sea which cannot be avoided.

3. If more speed can be given to a boat than is sufficient to prevent her being carried back by a surf, her way may be checked on its approach, which will give her an easier passage over it.

II. *On running before a Broken Sea, or Surf, to the Shore.*

The one great danger, when running before a broken sea, is that of *broaching-to*. To that peculiar effect of the sea, so frequently destructive of human life, the utmost attention must be directed.

The cause of a boat's broaching-to when running before a broken sea or surf is, that her own motion being in the same direction as that of the sea, whether it be given by the force of oars or sails, or by the force of the sea itself, she opposes no resistance to it, but is carried before it. Thus, if a boat be running with her bow to the shore and her stern to the sea, the first effect of the surf or roller, on

its overtaking her, is to throw up the stern, and as a consequence to depress the bow; if she then has sufficient inertia (which will be proportional to weight) to allow the sea to pass her, she will in succession pass through the descending, the horizontal, and the ascending positions, as the crest of the wave passes successively her stern, her midships, and her bow, in the reverse order in which the same positions occur to a boat propelled to seaward against a surf. This may be defined as the safe mode of running before a broken sea.

But if a boat, on being overtaken by a heavy surf, has not sufficient inertia to allow it to pass her, the first of the three positions above enumerated alone occurs; her stern is raised high in the air, and the wave carries the boat before it, on its front or unsafe side, sometimes with frightful velocity, the bow all the time deeply immersed in the hollow of the sea, where the water, stationary or comparatively so, offers a resistance, whilst the crest of the sea, having the actual motion which causes it to break, forces onward the stern or rear end of the boat. A boat will, in this position, sometimes, aided by careful oar-steerage, run a considerable distance until the wave has broken and expanded itself. But it will often happen that if the bow be low it will be driven under water, when, the buoyancy being lost forward, whilst the sea presses on the stern, the boat will be thrown (as it is termed) end over end; or if the bow be high, or it be protected, as in most life-boats, by a bow air-chamber, so that it does not become submerged, that the resistance forward, acting on one bow, will slightly turn the boat's head, and the force of the surf being transferred to the opposite quarter, she will in a moment be turned round broadside by the sea, and be

thrown by it on her beam-ends, or altogether capsized. It is in this manner that most boats are upset in a surf, especially on flat coasts, and in this way many lives are annually lost amongst merchant seamen, when attempting to land after being compelled to desert their vessels.

Hence it follows, that the management of a boat, when landing through a heavy surf, must, as far as possible, be assimilated to that when proceeding to seaward against one, at least so far as to stop her progress shoreward at the moment of being overtaken by a heavy sea, and thus enabling it to pass her. There are different ways of effecting this object :

1. By turning a boat's head to the sea before entering the broken water, and then backing in stern foremost, pulling a few strokes ahead to meet each heavy sea, and then again backing astern. If a sea be really heavy and a boat small, this plan will be generally the safest, as a boat can be kept more under command when the full force of the oars can be used against a heavy surf than by backing them only.

2. If rowing to shore with the stern to seaward, by backing all the oars on the approach of a heavy sea, and rowing ahead again as soon as it has passed to the bow of the boat, thus rowing in on the back of the wave ; or, as is practiced in some life-boats, placing the after-oarsmen with their faces forward, and making them row back at each sea on its approach.

3. If rowed in bow foremost, by towing astern a pig of ballast or large stone, or a large basket, or a canvas bag, termed a "drogue" or drag, made for the purpose, the object of each being to hold the boat's stern back, and prevent her being turned broadside to the sea or broaching-to.

Drogues are in common use by the boatmen on the Nor-

folk coast; they are conical-shaped bags of about the same form and proportionate length and breadth as a candle-extinguisher, about two feet wide at the mouth and four and a half feet long. They are towed with the mouth foremost by a stout rope; a small line, termed a tripping-line, being fast to the apex or pointed end. When towed with the mouth foremost they fill with water and offer a considerable resistance, thereby holding back the stern; by letting go the stouter rope and retaining the smaller line their position is reversed, when they collapse, and can be readily hauled into the boat.

Drogues are chiefly used in sailing-boats, when they both serve to check a boat's way and to keep her end on to the sea. They are, however, a great source of safety in rowing-boats, and the rowing life-boats of the National Life Boat Institution are now all provided with them.

A boat's sail bent to a yard and towed astern loosed, the yard being attached to a line capable of being veered, hauled, or let go, will act in some measure as a drogue, and will tend much to break the force of the sea immediately astern of the boat.

Heavy weights should be kept out of the extreme ends of a boat; but when rowing before a heavy sea the best trim is deepest by the stern, which prevents the stern being readily thrown on one side by the sea.

A boat should be steered by an oar over the stern, or on one quarter, when running before a sea, as the rudder will then at times be of no use. If the rudder be shipped, it should be kept amidships on a sea breaking over the stern.

The following general rules may therefore be depended on when running before, or attempting to land, through a heavy surf or broken water :

1. As far as possible, avoid each sea by placing the boat where the sea will break ahead or astern of her.

2. If the sea be very heavy, or if the boat be very small, and especially if she have a square stern, bring her bow round to seaward and back her in, rowing ahead against each heavy surf that cannot be avoided sufficiently to allow it to pass the boat.

3. If it be considered safe to proceed to the shore bow foremost, back the oars against each sea at its approach, so as to stop the boat's way through the water as far as possible; and if there is a drogue, or any other instrument in the boat which may be used as one, tow it astern to aid in keeping the boat end on to the sea, which is the chief object in view.

4. Bring the principal weights in the boat towards the end that is to be seaward, but not to the extreme end.

5. If a boat, worked by both sails and oars, be running under sail for the land through a heavy sea, her crew should, under all circumstances, unless the beach be quite steep, take down her masts and sails before entering the broken water, and take her to land under oars alone, as above described. If she have sails only, her sails should be much reduced, a half-lowered foresail or other small head-sail being sufficient.

III. *Beaching or Landing through a Surf.*

The running before a surf or broken sea, and the beaching or landing of a boat, are two distinct operations; the management of boats as above recommended, has exclusive reference to running before a surf when the shore is so flat that the broken water extends to some distance from the beach. Thus, on a very steep beach, the first heavy

fall of broken water will be on the beach itself, whilst on some very flat shores there will be broken water as far as the eye can reach, sometimes extending to even four or five miles from the land. The outermost line of broken water, on a flat shore, where the waves break in three and four fathoms water, is the heaviest, and therefore the most dangerous; and, when it has been passed through in safety, the danger lessens as the water shoals, until, on nearing the land, its force is spent and its power harmless. As the character of the sea is quite different on steep and flat shores, so is the customary management of boats on landing different in the two situations. On the flat shore, whether a boat be run or backed in, she is kept straight before or end on to the sea until she is fairly aground, when each surf takes her further in as it overtakes her, aided by the crew, who will then generally jump out to lighten her, and drag her in by her sides. As above stated, sail will in this case have been previously taken in if set, and the boat will have been rowed or backed in by oars alone.

On the other hand, on the *steep* beach, it is the general practice, in a boat of any size, to retain speed right on to the beach, and in the act of landing, whether under oars or sail, to turn the boat's bow half round towards the direction from which the surf is running, so that she may be thrown on her broadside up the beach, where abundance of help is usually at hand to haul her as quickly as possible out of the reach of the sea. In such situations, we believe, it is nowhere the practice to back a boat in sternforemost under oars, but to row in under full speed as above described

IV. *Boarding a Wreck, or a Vessel, under Sail or at Anchor, in a Heavy Sea.*

The circumstances under which life-boats or other boats have to board vessels, whether stranded or at anchor, or under way, are so various that it would be impossible to draw up any general rule for guidance. Nearly everything must depend on the skill, judgment, and presence of mind of the coxswain or officer in charge of the boat, who will often have those qualities taxed to the utmost, as undoubtedly the operation of boarding a vessel in a heavy sea or surf is frequently one of extreme danger.

It will be scarcely necessary to state that, whenever practicable, a vessel, whether stranded or afloat, should be boarded to leeward, as the principal dangers to be guarded against must be the violent collision of the boat against the vessel, or her swamping or upsetting by the rebound of the sea, or by its irregular direction on coming in contact with the vessel's side; and the greater violence of the sea on the windward side is much more likely to cause such accidents. The danger must, of course, also be still further increased when the vessel is aground and the sea breaking over her. The chief danger to be apprehended on boarding a stranded vessel on the lee side, if broadside to the sea, is the falling of the masts; or if they have been previously carried away, the damage or destruction of the boat amongst the floating spars and gear alongside. It may therefore, under such circumstances, be often necessary to take a wrecked crew into a life-boat from the bow or stern; otherwise a rowing-boat, proceeding from a lee shore to a wreck, by keeping under the vessel's lee, may use her as a break-water, and thus go off in comparatively smooth water, or be at least shielded from the worst of the sea. This is, accordingly,

the usual practice in the rowing life-boats around the United Kingdom. The larger sailing life-boats, chiefly on the Norfolk and Suffolk coasts, which go off to wrecks on outlying shoals, are, however, usually anchored to windward of stranded vessels, and then veered down to 100 or 150 fathoms of cable, until near enough to throw a line on board. The greatest care, under these circumstances, has, of course, to be taken to prevent actual contact between the boat and the ship; and the crew of the latter have sometimes to jump overboard and to be hauled to the boat by ropes.

In every case of boarding a wreck or a vessel at sea, it is important that the lines by which a boat is made fast to the vessel should be of sufficient length to allow of her rising or falling freely with the sea; and every rope should be kept in hand ready to cut or slip it in a moment if necessary. On wrecked persons or other passengers being taken into a boat in a sea way, they should be placed on the thwarts in equal numbers on either side, and be made to sit down. All crowding or rushing headlong into the boat should be prevented as far as possible; and the captain of a ship, if a wreck, should be called on to remain on board to preserve order until every other person has left her.

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

BY JOSEPH R. HODGSON.

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.
2. Before jumping in to save him, divest yourself as far

and as quickly as possible of all clothes ; tear them off, if necessary ; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds till he gets quiet ; for it is sheer madness to take hold of a man when he is struggling in the water, and if you do you run a great risk.



Method of rescuing a drowning man.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible on to his back, give him a sudden pull, and this will cause him to float ; then throw yourself on your back also and swim for the shore, both hands having hold of his hair, you on your back and he also on his, and of course his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons ; the writer has even, as an experiment, done it with four, and gone with them forty or fifty yards in the sea. One great advantage of this method

is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair, and throw both the person and yourself on your backs. After many experiments it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a death-grasp; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air-bubbles, which will occasionally rise to the surface, allowance being of course made for the motion of the water, if in a tide-way or stream, which will have carried the bubbles out of a perpendicular course in rising to the surface. A body may be often regained from the bottom, before too late for recovery, by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used, in conjunction with the feet, in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself, or having hold of a person who cannot swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide,

and sinks in the effort, when, if he had floated, a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

INSTRUCTIONS FOR "LIFE-SAVING SERVICE."

DIRECTIONS FOR RESTORING THE APPARENTLY DROWNED.

RULE I. *Arouse the patient.*—Unless in danger of freezing, do not move the patient, but instantly expose the face to a current of fresh air, wipe dry the mouth and nostrils, rip the clothing so as to expose the chest and waist, and



FIG. I. *Showing the first step taken, by which the chest is emptied of air, and the ejection of any fluids swallowed is assisted.*

give two or three quick smarting slaps on the stomach and chest with the open hand. If the patient does not revive, then proceed thus:

RULE II. *To draw off water, etc., from the stomach and chest.*—(See Fig. I)—If the jaws are clenched, separate

them, and keep the mouth open by placing between the teeth a cork or small bit of wood ; turn the patient on the face, a large bundle of tightly-rolled clothing being placed beneath the stomach, and press heavily over it for half a minute, or so long as fluids flow freely from the mouth.

RULE III. *To produce breathing.*—(See Fig. II.)—Clear the mouth and throat of mucus, by introducing into the throat the corner of a handkerchief wrapped closely around



FIG. II. *Showing the position and action of the operator, in alternately producing artificial expiration and inspiration of air.*

the forefinger ; turn the patient on the back, the roll of clothing being so placed beneath it as to raise the pit of the stomach above the level of any other part of the body. If there be another person present, let him, with a piece of dry cloth, hold the tip of the tongue out of one corner of the mouth, (this prevents the tongue from falling back and choking the entrance to the windpipe,) and with the other hand grasp both wrists and keep the arms forcibly stretched back above the head, thereby increasing the prominence

of the ribs, which tends to enlarge the chest. The two last-named positions are not, however, essential to success. Kneel beside or astride the patient's hips, and with the balls of the thumbs resting on either side of the pit of the stomach, let the fingers fall into the grooves between the short ribs, so as to afford the best grasp of the waist. Now, using your knees as a pivot, throw all your weight forward on your hands, and at the same time squeeze the waist between them, as if you wished to force everything in the chest upward out of the mouth; deepen the pressure while you can count slowly one, two, three; then suddenly let go with a final push, which springs you back to your first kneeling position. Remain erect on your knees while you can count one, two, three; then repeat the same motions as before at a rate gradually increased from four or five to fifteen times in a minute, and continue thus this bellows movement with the same regularity that is observable in the natural motions of breathing which you are imitating. If natural breathing be not restored, after a trial of the bellows movement for the space of three or four minutes, then, without interrupting the artificial respiration, turn the patient a second time on the stomach, as directed in Rule II, rolling the body in the opposite direction from that in which it was first turned, for the purpose of freeing the air-passages from any remaining water. Continue the artificial respiration from one to four hours, or until the patient breathes; and for a while, after the appearance of returning life, carefully aid the first short gasps until deepened into full breaths. Continue the drying and rubbing, which should have been unceasingly practised from the beginning, taking care not to interfere with the means employed to produce breathing. Thus the

limbs of the patient should be rubbed, always in an upward direction towards the body, with firm-grasping pressure and energy, using the bare hands, dry flannels or handkerchiefs, and continuing the friction under the blankets or over the dry clothing. The warmth of the body can also be promoted by the application of hot flannels to the stomach and arm-pits, bottles or bladders of hot water, heated bricks, etc., to the limbs and soles of the feet.

RULE IV. AFTER TREATMENT.—*Externally*: As soon as breathing is established let the patient be stripped of all wet clothing, wrapped in blankets only, put to bed comfortably warm, but with a free circulation of fresh air, and left to perfect rest. *Internally*: Give a little brandy and hot water, or other stimulant at hand, every ten or fifteen minutes for the first hour, and as often thereafter as may seem expedient. *Later manifestations*: After reaction is fully established, there is great danger of congestion of the lungs; and if perfect rest is not maintained for at least forty-eight hours, it sometimes occurs that the patient is seized with great difficulty of breathing, and death is liable to follow unless immediate relief is afforded. In such cases apply a large mustard plaster over the breast. If the patient gasps for breath, before the mustard takes effect, assist the breathing by carefully repeating the artificial respiration.

NOTE.—An eminent authority, Dr. Labordette, the Supervising Surgeon of the Hospital of Lisieux, in France, appears to have established that the clenching of the jaws and the semi-contraction of the fingers, which have hitherto been considered signs of death, are, in fact, evidences of remaining vitality. After numerous experiments with apparently drowned persons, and also with animals, he con-

cludes that these are only signs accompanying the first stage of suffocation by drowning, the jaws and hands becoming relaxed when death ensues.* This being so, the mere clenching of the jaws and semi-contraction of the hands must not be considered as reasons for the discontinuance of efforts to save life, but should serve as a stimulant to vigorous and prolonged efforts to quicken vitality. Persons engaged in the tasks of resuscitation are, therefore, earnestly desired to take hope and encouragement for the life of the sufferer from the signs above referred to, and to continue their endeavors accordingly. In a number of cases Dr. Labordette restored to life persons whose jaws were so firmly clenched that, to aid respiration, their teeth had to be forced apart with iron instruments.

* The muscular rigidity of death (*rigor mortis*) occurs later, after the temporary relaxation here referred to.

CHAPTER XXI.

MISCELLANEOUS.

Bright Work—Stowage of Holds—Scraping Spars—National Holidays—Dressing Ship—Manning Yards—Mourning—Navy Yards—Recipes for Paints, Stains, Currency Tables, etc., etc.

CLEANING BRIGHT WORK.

What is bright work?

The name applied to the metal objects on board ship, which are kept bright by polishing. The call for *gun bright work* is by the bugle or drum—for *deck bright work* by passing the word.

What is “gun bright work?”

The metal objects, around the battery, that are kept bright.

What is “deck bright work?”

The metal objects, around the decks, that are kept bright.

REMARKS.

At the call for *gun* or *deck bright work*, proceed at once to the proper station for cleaning. The gun's crews clean their own bright work. Afterguards and mizzen topmen and part of main topmen clean the deck bright work abaft the main mast. Forecastle men, fore and a part of main topmen, clean forward of the main mast. The gun deck bright work is cleaned by the port watch. Any extra bright work is cleaned by extra duty men.

At the call, the people, stationed, break out the tarpaulin and spread it on deck, near the bright work to be cleaned, placing the brick and cleaning rags on it. The oil should

be in charge of the quarter-gunners or captains of the different parts of the ship, and should not be left on the tarpaulin, where it will be likely to spill and stain the deck. When used, however, it should always be poured, having the tarpaulin to protect the deck. Be careful not to waste the brick, but scrape it off in small quantities as needed.

A little oil mixed with brick will remove verdigris, etc.

Keep off the tarpaulin and do not tramp brick and oil over the deck.

Keep the brick and cleaning rags off the deck.

If the bright work is gone over, with an oiled rag, during rainy or bad weather, it will not turn so quickly

STOWAGE OF A HOLD.

What is first stowed in a hold?

Ballast, composed of pigs of iron.

What is "winging out" the ballast?

Lengthening it out from the keel to the sides. "Winging out" tends to make a vessel roll; and "building up" amidships, to keep her steady.

What are stowed on top of the ballast?

Water-tanks; they are of iron, made to fit the form of the hold, and are stowed according to their marks in their proper places.

How are they slung and stowed?

They are slung by placing an iron toggle in the man-hole (hole in the top of the tank), the tackle hooking to an eye or ring in the toggle. When stowed, they should be placed compactly, and form an even surface on top. They are then wedged with slips of wood, and the seams caulked and pitched, so that no dirt may work down between them.

What is done with wood before stowing in the hold?

It is "barked," all insects, dirt, etc., knocked off. Wood is used to chock up casks, etc., in the hold, as well as for fire-wood.

How are beef and pork barrels stowed?

Beef on the port side, Pork on the starboard side, and fill in with wood between the barrels.

Where are the wet and dry provisions usually stowed?

The *dry* provisions *aft*, the *wet* provisions *forward*.

What are the "wet" and the "dry" provisions?

The *wet* provisions consist of beef, pork, vinegar, etc., etc. The *dry* consist of flour, rice, beans, etc., etc.

What is stowed overhead in the hold?

Oars, boat-hooks, lumber, pieces of iron, spare gun gear, etc., etc., etc.

What is done with lime before receiving it inboard?

It is well slacked (mixed with water).

Where are the sails stowed?

In the sail-room.

Where is the tar, pitch, etc., stowed?

In the fore-hold.

What is stowed in the spirit room?

Sugar, tea, tobacco, clothing, etc., etc.

SCRAPING SPARS.

The spars are scraped, and afterwards slushed (greased) down; this is done to brighten up aloft. A windy day, with wind abeam, if possible, is usually taken, in order that the scrapings, etc., will blow clear of the decks and boats.

The topgallant and royal masts, topmasts, yard-arms, of light yards, jib and flying jib booms, spanker boom, gaffs and all studding sail booms are scraped; the latter (studding sail booms) should not be greased unless they can remain triced up; otherwise they will grease the sails.

The davit strong-backs, if not painted, must be scraped, also trysail and spanker masts, rungs of jacob's ladders, ends of whisker booms, etc., etc.

NATIONAL HOLIDAYS—DRESSING SHIP—MANNING YARDS—
MOURNING.

What are the National Holidays in the United States?

July 4th, the anniversary of the Declaration of Independence; and February 22d, the anniversary of Washington's birthday.

Our men-of-war are "*dressed*" on the National Holidays, and also when assisting in the celebration of the anniversaries of foreign powers.

Dressing Ship.

Ensign at each mast-head.

From flying jib-boom end to foretop-gallant head.
[Pennants and square flags alternately.]

Thence to main top-gallant mast-head. [Same arrangement.]

Thence to mizzen top-gallant mast-head. [Same.]

Thence to peak, thence to boom end. [Square flags.]

From spanker-boom end hang ship's pennants, and from the flying jib-boom end the number, a lead being bent on to each to keep them from flying away.

Topgallant yards are not usually sent down the evening before dressing ship.

The flying jib and royal halliards are used to trice up by, rove through blocks at the mast-heads, with down-hauls made fast. And the flags, in addition to being stopped at the head and tack, are stitched to the halliards amidships. Reeve them beforehand, and bend on the flags.

Before tricing up, send people aloft to keep the flags clear. Trice up mast-head ensigns first.

When dressing in honor of a foreign power, courtesy requires the colors of that power to be displayed at the main topgallant mast-head.

On a shift of wind, or at the turn of the tide, if in a tideway, hands should be sent aloft together to clear the flags.

When are yards manned?

When receiving the President of the United States, and the rulers of all foreign countries.

How is a man-of-war put in mourning?

By half-masting the colors, and in addition "minute guns" are sometimes fired.

Merchant vessels, in addition to half-masting the colors, sometimes cock-bill the yards.

The ENSIGN, if at half-mast, must always be mast-headed, before hauling down at sunset.

NAVY YARDS AND STATIONS IN THE UNITED STATES.

Navy Yard at Kittery, Maine, called the "Portsmouth Navy Yard" (being on the opposite side of the river from that city).

Navy Yard, Charlestown, Mass., near Boston, called the "Boston Navy Yard."

"Torpedo Station," and the "Naval Training Station" at Newport, R. I.

"Naval Station," New London, Conn.

Navy Yard, Brooklyn, N. Y., called the "New York Navy Yard."

Naval Station at League Island, Pa., near Philadelphia, Pa.

Navy Yard at Gosport, Va., opposite the city of Norfolk, Va., called "Norfolk Navy Yard."

Navy Yard, Washington, D. C.

Naval Academy, and Experimental Battery, Annapolis, Md.

Naval Station near Port Royal, S. C.

Naval Station at Key West, Florida.

Navy Yard, Pensacola, Florida.

Navy Yard at Mare Island, Cal., about thirty miles above San Francisco.

"Naval Nitre Depot," at Malden, Mass.

PAINTS, STAINS, ETC., ETC.

Proportions of materials for mixing paints, as ordered by the Bureau of Construction and Repair, Navy Department.

Black for outside work.

100 pounds lampblack ground in linseed oil.

10 gallons linseed oil *raw*.

1 gallon turpentine.

3 quarts Japan drier.

One pound will cover about five square yards of surface.

White for outside work.

100 pounds of white-lead in oil.

3½ gallons linseed oil *raw*.

2 quarts turpentine.

3 pints Japan drier.

One pound will cover about one and a half square yards of surface.

White for inside work.

50 pounds whitelead, in oil.

50 pounds white zinc, in oil.

2 gallons linseed oil, raw.

2 gallons turpentine.

1 pint Japan drier.

One pound will cover about three square yards of surface.

White for inside work to be varnished.

100 pounds white zinc, in oil.

1 quart linseed oil, raw.

3 gallons turpentine.

1 pound sugar of lead drier.

One pound will cover about three square yards of surface.

Straw color for spars.

100 pounds whitelead, in oil.

3½ gallons linseed oil, raw.

10 pounds French yellow, in oil.

1½ pounds Venetian red, in oil.

½ pound vermilion.

2 quarts turpentine.

3 pints Japan drier.

One pound will cover about one and a half square yards of surface.

PROPORTION OF MATERIAL FOR MIXING SHELLAC.

Shellac varnish.

3 pounds gum shellac.

1 gallon alcohol.

Shellac for decks.

2 pounds gum shellac.

2 pounds French yellow, dry.

1 gallon alcohol.

One gallon will cover about twenty square yards of surface.

USEFUL RECIPES.

Copper color paint.

Six parts spruce ochre.

One part venetian red.

One part of black.

Bronze paint.

2 pounds chrome green.

1 ounce ivory black.

1 ounce chrome yellow.

1 gill good Japan.

Grind altogether, and mix with linseed oil.

A little salt added to black paint, will prevent blistering.

Removing old paint.

One part of pearl-ash mixed with three parts of quick stone-lime, (by slacking the lime in water, and then adding pearlash) laid over paint work, and allowed to stand fourteen or sixteen hours, will soften it so that it can be easily scraped off.

Oil polish.

Dissolve resin in turpentine to about the consistency of treacle; add two pints of linseed-oil to one of resin and turpentine.

STAINING.

Ebony stain.

3 pounds logwood.

$\frac{1}{2}$ pound copperas.

$\frac{1}{4}$ pound nut gall.

1 gallon vinegar.

To be well boiled, and used while *hot*.

The wood, to be stained, must be sandpapered before and after the stain is put on. Apply at least four coats of stain, each coat to be well rubbed in. Oil well when finished.

Black gun polish.

4 ounces resin.

2 ounces lampblack.

2 ounces shellac.

1 quart linseed oil.

Boil fifty minutes, then add 3 ounces beeswax, half pint of turpentine.

For bronzed guns omit the lampblack.

Black polish for iron.

1 pint coal tar.

1 ounce lampblack.

$\frac{1}{2}$ ounce hellebore.

1 ounce beeswax.

The beeswax and hellebore to be dissolved in the turpentine; then add the lampblack and tar; mix, warm it well, and apply at once.

CURRENCY TABLE.

Francs Reduced into Dollars and Cents.

1 Franc = 100 Centimes.

1 Centime = 0.193 Cents.	20 Centimes = 3.860 Cents.
2 " = 0.386 "	30 " = 5.790 "
3 " = 0.579 "	40 " = 7.720 "
4 " = 0.772 "	50 " = 9.650 "
5 " = 0.965 "	60 " = 11.580 "
6 " = 1.158 "	70 " = 13.510 "
7 " = 1.351 "	80 " = 15.440 "
8 " = 1.544 "	90 " = 17.370 "
9 " = 1.737 "	100 " = 19.300 "
10 " = 1.930 "	

1 Cent = 5.181347 Centimes.

Frs.	\$	c.	Frs.	\$	c.	Frs.	\$	c.	Frs.	\$	c.
1		20	27	5	21	53	10	23	79	15	25
2		39	28	5	40	54	10	42	80	15	44
3		58	29	5	60	55	10	62	81	15	63
4		77	30	5	79	56	10	81	82	15	83
5		97	31	5	98	57	11	00	83	16	02
6	1	16	32	6	18	58	11	19	84	16	21
7	1	35	33	6	37	59	11	39	85	16	41
8	1	54	34	6	56	60	11	58	86	16	60
9	1	74	35	6	76	61	11	77	87	16	79
10	1	93	36	6	95	62	11	97	88	16	98
11	2	12	37	7	14	63	12	16	89	17	18
12	2	32	38	7	33	64	12	35	90	17	37
13	2	51	39	7	53	65	12	55	91	17	56
14	2	70	40	7	72	66	12	74	92	17	76
15	2	90	41	7	91	67	12	93	93	17	95
16	3	09	42	8	11	68	13	12	94	18	14
17	3	28	43	8	30	69	13	32	95	18	34
18	3	47	44	8	49	70	13	51	96	18	53
19	3	67	45	8	69	71	13	70	97	18	72
20	3	86	46	8	88	72	13	90	98	18	91
21	4	05	47	9	07	73	14	09	99	19	11
22	4	25	48	9	26	74	14	28	100	19	30
23	4	44	49	9	46	75	14	48	200	38	60
24	4	63	50	9	65	76	14	67	300	57	90
25	4	83	51	9	84	77	14	86	400	77	20
26	5	02	52	10	04	78	15	05	500	96	50

DOLLARS AND CENTS REDUCED INTO FRANCS AND CENTIMES.

Dollars . .	Cents . .	Centimes .	Francs . .	Centimes .	Francs . .	Dollars . .	Cents . .	Centimes .	Francs . .	Centimes .
	1	05		8	0	41		15	0	78
	2	10		9	0	47		16	0	83
	3	16		10	0	52		17	0	88
	4	21		11	0	57		18	0	93
	5	26		12	0	62		19	0	98
	6	31		13	0	67		20	1	04
	7	36		14	0	73		21	1	09

Cents . . Dollars . .	Centesimes . Francs . .	Centesimes . Dollars . .	Cents . . Dollars . .	Centesimes . Francs . .	Centesimes . Dollars . .	Cents . . Dollars . .	Centesimes . Francs . .
22	1 14		63	3 26		5 00	25 90
23	1 19		64	3 32		6 00	31 08
24	1 24		65	3 37		7 00	36 27
25	1 30		66	3 42		8 00	41 45
26	1 35		67	3 47		9 00	46 63
27	1 40		68	3 52		10 00	51 81
28	1 45		69	3 57		11 00	56 99
29	1 50		70	3 63		12 00	62 17
30	1 55		71	3 68		13 00	67 35
31	1 61		72	3 73		14 00	72 53
32	1 66		73	3 78		15 00	77 72
33	1 71		74	3 83		16 00	82 90
34	1 76		75	3 88		17 00	88 08
35	1 81		76	3 94		18 00	93 26
36	1 87		77	3 99		19 00	98 44
37	1 92		78	4 04		20 00	103 62
38	1 97		79	4 09		21 00	108 80
39	2 02		80	4 14		22 00	113 98
40	2 07		81	4 20		23 00	119 17
41	2 12		82	4 25		24 00	124 35
42	2 18		83	4 30		25 00	129 53
43	2 23		84	4 35		26 00	134 71
44	2 28		85	4 40		27 00	139 89
45	2 33		86	4 45		28 00	145 07
46	2 38		87	4 50		29 00	150 25
47	2 44		88	4 56		30 00	155 44
48	2 49		89	4 61		31 00	160 62
49	2 54		90	4 66		32 00	165 80
50	2 59		91	4 71		33 00	170 98
51	2 64		92	4 77		34 00	176 16
52	2 69		93	4 82		35 00	181 34
53	2 75		94	4 87		36 00	186 53
54	2 80		95	4 92		37 00	191 71
55	2 85		96	4 97		38 00	196 89
56	2 90		97	5 02		39 00	202 07
57	2 95		98	5 08		40 00	207 25
58	3 01		99	5 13		41 00	212 43
59	3 06	1 00		5 18		42 00	217 61
60	3 11	2 00		10 36		43 00	222 79
61	3 16	3 00		15 54		44 00	227 98
62	3 21	4 00		20 72		45 00	233 16

Pence.	Cents.	Pence.	Cents.	Farthings.	Cents.
1	2.027708	7	14.193956	1	.506927
2	4.055416	8	16.221664	2	1.013854
3	6.083124	9	18.249372	3	1.520771
4	8.110832	10	20.277080	4	2.027708
5	10.138540	11	22.304788		
6	12.166248	12	24.332500		

DOLLARS AND CENTS REDUCED INTO STERLING MONEY.

Cents.	d.	Farthings.	Cents.	d.	Farthings.	Cents.	d.	Farthings.
1		1.97267	8	3	3.78136	15	7	1.59005
2		3.94534	9	4	1.75403	16	7	3.56272
3	1	1.91801	10	4	3.72670	17	8	1.53539
4	1	3.89068	11	5	1.69937	18	8	3.50806
5	2	1.86335	12	5	3.67204	19	9	1.48073
6	2	3.83602	13	6	1.64471	20	9	3.45340
7	3	1.80869	14	6	3.61738			

\$	c.	£	s.	d.	\$	c.	£	s.	d.	\$	c.	£	s.	d.
	25		1	1	15	00	3	1	8	32	00	6	11	6
	50		2	1	16	00	3	5	9	33	00	6	15	7
	75		3	1	17	00	3	9	11	34	00	6	19	9
1	00		4	1	18	00	3	14	0	35	00	7	3	10
2	00		8	3	19	00	3	18	1	36	00	7	7	11
3	00		12	4	20	00	4	2	2	37	00	7	12	1
4	00		16	5	21	00	4	6	4	38	00	7	16	2
5	00	1	0	7	22	00	4	10	5	39	00	8	0	3
6	00	1	4	8	23	00	4	14	6	40	00	8	4	5
7	00	1	8	9	24	00	4	18	8	41	00	8	8	6
8	00	1	12	10	25	00	5	2	9	42	00	8	12	7
9	00	1	17	0	26	00	5	6	10	43	00	8	16	8
10	00	2	1	1	27	00	5	10	11	44	00	9	0	10
11	00	2	5	3	28	00	5	15	1	45	00	9	4	11
12	00	2	9	4	29	00	5	19	2	46	00	9	9	0
13	00	2	13	5	30	00	6	3	4	47	00	9	13	2
14	00	2	17	7	31	00	6	7	5	48	00	9	17	3

\$ c.	£ s. d.	\$ c.	£ s. d.	\$ c.	£ s. d.
49 00	10 1 4	67 00	13 15 4	85 00	17 9 3
50 00	10 5 6	68 00	13 19 5	86 00	17 13 5
51 00	10 9 7	69 00	14 3 6	87 00	17 17 6
52 00	10 13 9	70 00	14 7 8	88 00	18 1 8
53 00	10 17 10	71 00	14 11 9	89 00	18 5 9
54 00	11 1 11	72 00	14 15 11	90 00	18 9 10
55 00	11 6 0	73 00	15 0 0	91 00	18 14 0
56 00	11 10 1	74 00	15 4 1	92 00	18 18 1
57 00	11 14 3	75 00	15 8 3	93 00	19 2 2
58 00	11 18 4	76 00	15 12 4	94 00	19 6 3
59 00	12 2 6	77 00	15 16 5	95 00	19 10 5
60 00	12 6 7	78 00	16 0 6	96 00	19 14 6
61 00	12 10 8	79 00	16 4 8	97 00	19 18 7
62 00	12 14 10	80 00	16 8 9	98 00	20 2 9
63 00	12 18 11	81 00	16 12 10	99 00	20 6 10
64 00	13 3 0	82 00	16 16 11	100 00	20 10 11
65 00	13 7 1	83 00	17 1 0		
66 00	13 11 3	84 00	17 5 2		

CHAPTER XXII.

CUTTING AND FITTING RIGGING.

Cutting, etc.

The length of shrouds, stays, backstays and all standing rigging is determined from an accurate "scale draft" of the vessel to be rigged, which is furnished by the Construction Department, and is usually upon the scale of one-eighth of an inch to one foot, making it convenient to use a common two-foot rule, the inches of which are divided into eighths.

Having an accurate draft of the hull and spars of a ship, the measures may be readily taken and the rigging cut and fitted, so that it can be sent aloft as soon as the masts are ready to receive it.

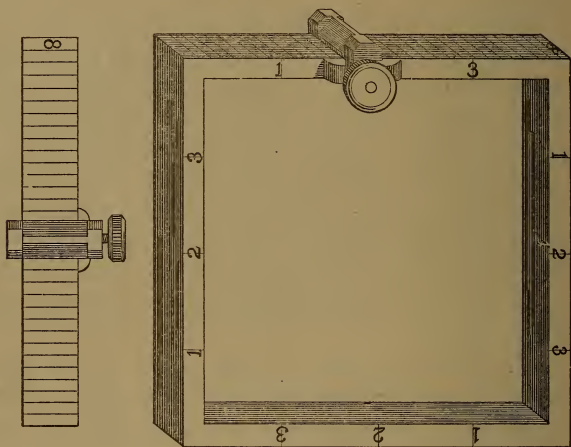
In order to cut by draft, a "beam draft" is necessary, giving the breadth of beam and width of channels abreast each mast, also a "fore-and-aft" or "working draft," giving the length and rake of each mast, the length of the channels, the position of the lower dead-eyes, as well as those of the tops. An end view of the head-booms will also be required.

There are several methods of measuring for standing rigging, the most convenient, of which, is measuring with the dividers, on the fore-and-aft or working draft of the vessel, the exact length of each leg of the shrouds, stays and backstays.

The "beam scale," invented by Boatswain Bell, U. S. Navy, is of great assistance in measuring for shrouds and backstays. It is a "hollow square" of composition, usually

graduated on two opposite edges of the square ; to eights of an inch on one edge, and to tenths of an inch on the other ; the graduated edges have a movable scale or vernier attached, which is controlled by a thumb screw.

To measure for shrouds and backstays ?



BEAM SCALE.

Use the fore-and-aft or working draft, the "beam scale," dividers and rule.

Having determined the "*half breadth of beam*" from the "beam draft," clamp the vernier of the "*beam scale*" at this distance. The position of each dead eye being located on the "working draft," proceed to measure in the following manner:

Place the "beam scale" on the "working draft" opposite to, *and in line with*, the position of the proposed shroud or backstay, about to be measured for (in this case the forward leg of No. 1 pair of shrouds), the "beam scale"

standing in an upright position, on one of the non-graduated sides.

Now measure, with the dividers, from the point on the "beam scale," where the vernier is clamped (which represent the position of the upper part or thimble of the forward dead eye), to the point at the mast-head, where the upper part of the eye *seizing* will come; transfer this to the rule, and note the length in feet, calculating $\frac{1}{8}$ of an inch to a foot; that is, for *each inch* on the draft allow *eight feet* on the rule; to this distance add *six feet*, for the turn up at the end, and *one-half* the length of the eye, the result will represent the length of the *forward leg* of the first, or No. 1 pair of shrouds. Measure for the after leg in the same manner.

The succeeding pairs of shrouds are measured for in the same manner, and in addition, the diameter of each pair of shrouds must be added in working aft; for example: to the second pair of shrouds add its own diameter, when fitted, for the third pair twice its diameter when fitted, and for the fourth pair three times its diameter. This is to allow for the rise on the mast-head of each successive pair of shrouds.

LOWER RIGGING.

Get the rope on a stretch and measure off the extreme length of each pair of shrouds from the draft. The middle of the length thus determined will be the center of the eye; paint, worm, parcel, paint again and serve throughout. Then measure off from the center of the eye on each leg of a pair of shrouds the required distance, or place, for the eye-seizing. The eye and both legs, to two feet below the eye-seizing, should be double-served, first parcelling with tarred flax, parcelling and serving with round-line. Then, over this double service, to a distance of one foot below the

place marked for the eye-seizing, put on the heading, which consists of tarred flax canvas, marled on with spun-yarn, the marling hitches to be on top. In putting on this heading, commence on each leg below the place marked for the eye-seizing, and work towards the center of the eye. When this is done, form the eye and put on the seizing, which is to be covered with tarred flax canvas securely marled on. After the shroud is let down and the eye formed, cut it to the length marked, and so continue until the rigging is all fitted for each mast. The shroud is then ready for turning in. To determine the place for eye-seizings of No. 1 pair of shrouds, measure off from the center of the eye two and one-half squares of the mast-head on each leg, and mark it for the upper turn of the seizing. The place of seizing for No. 2 to be the same distance, *plus* the diameter of the shroud; for No. 3 the same distance, *plus* twice the diameter, and so on for the others. Both legs of Nos. 1 and 2 will be leathered in the wake of the yard, to take the chafe of the lower yards when braced up.

When the rope is first got on a stretch and the first pair of shrouds is measured off, continue the fitting as far beyond the cut-mark (on the legs of the second pair) as the stretch will admit of.

Some riggers claim that, with wire rigging, five squares of the mast-head (once and one-quarter the round) is too much to allow for the eye of shrouds, and that it will make too long an eye.

A practical way of finding the length of an eye is as follows: Find the exact square of the mast-head to be rigged; take the "square fid" to be found in all rigging lofts, and mark on it the size of the mast-head. Then pass a piece of hemp or manilla rope the same size as the wire rope, about

to be fitted, around the fid in the form of an eye. Mark with a rope yarn where the upper part of the eye-seizing would come, and thus determine by *actual measurement* the length required for the eye about to be fitted.

The *upper* turns of the eye-seizings of all shrouds should be in a line with the *lower edge* of the bolsters. As before mentioned, the diameter of each pair of shrouds, after No. 1 pair, must be added for the *length of the eye*, in order that the seizings may lie as nearly as possible parallel to each other, and on the line of the bolsters.

When there is an odd shroud in the fore and main rigging, it should be the after shroud; the eye spliced the same length the heading would be, and seized above the crotch of the splice, making the eye the same as if it were a pair of shrouds, and fitted the same as Nos. 3 and 4. If there is an odd shroud in the mizzen rigging it is to be fitted straight (one leg on the starboard and the other on the port side), and spanned with the pendant forming the mast-head, and should be put over the mast-head first, the same as the pendants are put over the fore or mainmast-head.

TOPMAST RIGGING

Is to be fitted in the manner known as "*straight*," with one eye formed out of two pairs of shrouds, which gives two lifts or thicknesses on the mast-head, with four shrouds on each side, making a snug and neat mast-head.

It should be painted, wormed, parcelled, painted again, and served the entire length. The shrouds will be double-served from center of eye to three or four feet below the futtock-staff. The length of heading from center of eye down to one foot below the eye-seizing is put on the same as the lower rigging. Catharpins are to be of wire rope, wormed, painted, and parcelled, and double-served through-

out; to be fitted with eyes in each end, and should go abaft the mast and seize together in the center.

The topmast-head (burton) pendants will be wire rope, fitted with a shackle in one end and a link in the other; the shackle connects it to the link under the trestle-trees. Each topmast has four pendants, two forward and two abaft the rigging. The lower ends of pendants to hang six inches below the catharpin legs.

Pendants to be fitted the same as topmast rigging, without double service, except around their thimbles.

Sword mats will be substituted for double service on the swifsters of lower and topmast rigging.

TOPGALLANT RIGGING

Is to be painted, wormed, parcelled, painted again, and served the entire length; to go over the funnel on the mast-head. To be fitted in pairs, with eyes formed like the eyes of lower rigging, and seized so as to fit snug over the funnel.

The forward legs to be double served from the center of eye to one foot below the futtock-staff of topmast rigging; the after leg to be double served from centre of eye, three feet down; then from a point one foot above cross-trees to one foot below the futtock-staff; both legs to be leathered in the wake of cross trees, and to set up in the top with dead-eyes.

ROYAL SHROUDS, STAYS, AND BACKSTAYS.

Fore.—Will be painted, wormed, parcelled, painted again, and served the entire length; will be fitted to an iron wythe, with three eyes laid off at equal distances on the wythe. The shroud and backstay to be of one piece of rope rove through the eye of the wythe, and are seized

around a thimble there. Double service to be one foot down on the shroud and backstay from center of eye; double service on the shroud, and leathered in the nip of the jack. The stay to be spliced or shackled in the wythe; double served leathered in the nip of the flying-jib boom, in the clamp on the dolphin-striker, and also where it reeves through the bees on the bowsprit; to be set up with dead-eyes.

Main.—Fitted and set up the same as the fore; double service and leathered at the nip of the chock in the fore-topmast trestle-trees.

Mizzen.—Fitted and set up the same as the main; double service and leathered at the nip of the chock in the main-topmast cross-trees.

To measure for fore-and-aft stays?

Measure with the dividers, on the fore-and-aft or working draft, the distance from the after corner of the proper mast to the point where the upper hearts will be; transfer this distance to the rule (allowing as before for eights), add seven feet for the turn up at the end. An old rule was to allow the "length of the mast-head" for the formation of the collar; but riggers now allow seven squares of the mast-head for the length of the collar, an additional three feet being added for the splicing of the lashing-eyes.

FORE AND MAIN STAYS

Are to be fitted separate, with split collars and lashing-eyes, painted, wormed, parcelled, painted again, and served the entire length. Double service on ends of fore-stays, commencing from lower part of the end, quarter-seizing around the thimble and up eight feet on the standing parts. *Main stays*, double service around the thimbles, up to lower part of quarter-seizing, on the end and standing parts. The

lashing-eyes to be double served before splicing, which does away with outside parcelling and hitching.

Collars to be seized together in the loft, and leathered down to four feet below the crotch. To be set up with four-scored hearts.

Chains may be substituted for wire, on the main, in the wake of the smoke-stack, when needed.

To form the collars of topmast and lower stays?

Divide or split the rope to be fitted into two parts of *three* strands each. Each part being in length seven squares (once and three quarters the round of the mast-head, for which the stay is being fitted), with three feet added for the lashing-eye. Then from another rope, of the same size, take four strands, *two of which lay into each side* or leg of the collar, tucking the ends, and making a neat splice at the fork of the collar; by this means, the collar will have *five* strands in each leg. Eyes, for the lashing at the mast-head, (lashing-eyes) are spliced in the upper ends of the legs of the collar. When the collar is wormed, parcelled, served, etc., each leg will be about the same size as the rest of the stay.

MIZZEN STAYS.

Single service throughout; collars to be fitted the same as fore and main; double service around the thimble, which will be fitted in the lower end for the lanyard, instead of using hearts. The lower end may be split, in which case a thimble will be spliced in the end of each leg and set up by lanyards to bolts on each side of the main-mast.

FORE-TOPMAST STAYS

Are to be fitted separate; single service throughout; col-

lars the same as fore and main; double service from ten feet above the bowsprit to one foot inside of the leader under the bees; leathered over double service from four feet above the bees to eight inches inside the leader, under the bees. To be set up with three-scored hearts.

The service on the spring-stays will be omitted in the wake of the stay-sail hanks.

JIB STAYS

To be fitted like fore-topmast stays, with split collars, lashing-eyes, etc.; to be served from four feet above the boom to the end where it sets up; double service and leathered in the nip of the clamp on the dolphin-striker, and also where they go through the bees, leathered over the service from four feet above to eight inches below the boom; collars of jib and topmast stays seized together below the crotch around the stays. To be set up with three-scored hearts.

MAIN-TOPMAST STAYS

Fitted the same as fore-topmast stays; in long ships, with great distances between fore and main masts, they may be brought directly to the deck near the foremast; but in short ships they will pass through chocks between the fore trestle-trees, and set up on deck with three-scored hearts. Nips to be double served and leathered; collars seized together in the loft.

MIZZEN-TOPMAST STAYS.

Fitted the same as main-topmast stays, and set up in the main-top with three-scored hearts.

FORE-TOPGALLANT STAYS.

Painted, wormed, parcelled, painted again, and served

the entire length; to be double served on the eyes around the funnels, and from twelve feet above, to one foot below the jib-boom; also in the wake of the nip of the clamp on the dolphin-striker, and where they reeve through the bees. All nips to be leathered. Stays to be set up with dead-eyes.

MAIN-TOPGALLANT STAYS.

To be fitted the same as the fore, and set up with dead-eyes in the fore-top. To be double served and leathered at the hole in the fore-cap through which they lead; also to be leathered about three feet below the crotch of the eye-splice.

MIZZEN TOPGALLANT STAYS.

Fitted, served, leathered, and led in the same manner as the main, and set up in the main-top.

FLYING-JIB STAYS.

To be fitted with eye-splices, double served; to be served and leathered three feet below the crotch of splice; in all other respects to be fitted like the jib stays. To be set up with dead-eyes.

BOBSTAYS

Shall be made of chain, shackled to a plate in the cut-water, and set up with four-scored hearts.

BOWSPRIT SHROUDS.

To be fitted of wire rope, to lead well down on the bows, shackled to eye-bolts, and set up with three-scored hearts. Will be painted, wormed, parcelled, painted again, and served the entire length.

JIB GUYS.

To be of wire rope, painted, wormed, parcelled, painted

again, and served the entire length; double served and leathered in the wake of whiskers, over which they fit with horseshoe cringles; outer ends shackle to the wythe on the boom end; set up to the bows or cat-head with three-scored hearts.

FLYING-JIB GUYS.

Fitted, set up to the bows or cat-head with three-scored hearts, and connected with the boom, same as jib guys; reeve through thimbles in a strap out on the whisker yard-arms. Double served and leathered in the nip of the thimbles. To be of wire rope.

WHISKER-JUMPERS.

To be of wire rope; painted, wormed, parcelled, painted again, and served throughout; to be fitted with an eye-splice, double served and leathered, to fit over the whisker-boom end; the inner end to be leathered in the nip, and to set up on its own part through a bull's eye connected to a bolt on the cut-water.

BACK ROPES

Should be of hemp, served throughout, hooked or shackled to the dolphin-striker, and set up at the bows with three-scored hearts.

STANDING MARTINGALE STAYS

To be of wire rope, wormed, parcelled, and served the same as the guys. Fitted with shackles and thimbles in each end, with double service around the thimbles.

FLYING-JIB MARTINGALE STAYS.

Fitted the same as the standing martingales of wire; double served around the thimbles in the outer end, in the nip of the dolphin-striker, and where they reeve through the

bees. To be rove through the sheave in the dolphin-striker, and set up with dead-eyes.

FORE AND MAIN TOPMAST BACKSTAYS.

Fitted and measured off the same as the after-shrouds of the fore and main rigging.

MIZZEN TOPMAST BACKSTAYS

Are fitted with horseshoe eyes.

FORE, MAIN, AND MIZZEN TOPGALLANT BACKSTAYS.

To be painted, wormed, parcelled, painted again, and served throughout. Fitted with spliced eyes, which are double served, without outside parcelling.

BOAT-DAVIT TOPPING LIFTS, SPANS, AND GUYS.

To be of wire rope, and served throughout. Spans to which topping lift pendants are attached to be leathered in the middle.

Wire rope for stays, shrouding, and all standing rigging is placed upon reels, in a rigging loft, for convenience in getting it on a stretch.

In cutting standing rigging, which is to be fitted with the "Healy patent dead-eyes, etc.," the six feet allowance for the "turn up" of shrouds, and the seven feet "turn up" of stays, will not be necessary; but simply allow the *depth of the socket*, which is to be added to the distance measured from upper dead-eye or heart, to the proper place on the mast-head.

STANDING AND RUNNING RIGGING.

Length of rigging of all kinds is to be determined by an accurate draft of the vessel to be rigged.

All standing rigging to be 4-stranded, shroud-laid, galvanized wire rope; to be wormed, parcelled, and served

from end to end, as a protection against wear and tear, except stays on which sail is carried.

Upper dead-eyes for lower and topmast rigging are to be strapped with iron, and to have a stout galvanized iron-scored heart (Walton's) at the upper part of the strap to receive the rigging, the end of which, being passed up, is to be secured by five seizings, the two lower ones passed with racking under-turns; the lower dead-eyes to be connected with the chain-plates by bolts, so that they may be readily unshipped. Lower stays are to pass over an iron-scored heart, the ends to be secured like the ends of lower and topmast rigging, with at least five seizings, the two lower ones passed with racking-turns.*

All standing rigging to be set up by laniards, except the topmast rigging of fore-and-aft rigged vessels, which may be set up on end. Futtock shrouds to be made of iron rods set up with turnbuckles, to the top rims, and not to connect with the dead-eyes of the topmast rigging.

Hide rope, if ever used, after being fitted, will be given a lick of a mixture consisting of tallow and tar in the proportions of $\frac{1}{3}$ tallow to $\frac{4}{5}$ tar. This should be repeated at the end of every six months. The rope should be perfectly dry when thus treated. Oil must never be used, nor the rope soaked to make it pliable, but it must be fitted in a dry state.

Avoid serving the splices of hide rope. Avoid covering hemp rope with leather, and more especially with green hide, unless there be a good and well-tarred parcelling interposed.

*With the Healy dead-eye, this of course will not be necessary, the lower end of rigging fitting in the socket of upper dead-eye.

CHAPTER XXIII.

DEFINITIONS OF SEA TERMS, EXPRESSIONS, ETC.

Aback.—A sail is aback when the wind acts on its forward surface.

Abaft.—Behind—in rear of, on the after side.

Abaft the beam.—Astern of a line forming a right angle with the keel.

Abeam.—Opposite the center of the ship's side, or bearing eight points from the bow and stern.

Aboard.—On the ship.

About.—To go about, to change the ship's course by tacking.

A-lee.—The helm is a-lee when the tiller is put to the lee side.

All hands.—Assembling the ship's company.

Aloft.—Overhead.

Alongside.—Close to the ship's side.

Anchor.—To let go the anchor to hold the ship.

Anchorage.—Ground fit to anchor on, A berth.

Ashore.—On land, applied to a vessel when aground.

Astern.—Behind the ship.

Avast.—To stop, to cease hauling.

Bare poles.—Having no sail set.

Battens.—Strips of wood, such as those nailed over the tarpaulins of a hatch to batten down in bad weather, Chafing battens, etc.

Bearing.—The point of the compass on which any object appears. The direction an object lies.

Beating to windward.—Working a vessel as nearly as possible in the direction from which the wind blows, by tacking.

Becalm d.—Having no wind to fill the sails.

Bear a hand.—To hurry up.

Belay.—To make fast.

Berth.—An anchorage, A station, A sleeping place.

Brig.—Where prisoners are confined on board men-of-war.

Boarding.—The act of going on board a vessel.

Bouse.—To haul on.

Bulkheads.—Partitions in a ship.

Betwixt wind and water.—That portion of a vessel about the water line, which, by the motion of the vessel in the water, caused by the heave of the sea, is alternately above and below the surface.

By the board.—Over the side. A mast is said to “go by the board” when it is carried away.

Block and block.—When the two blocks of a tackle are together and there is no more fall to haul on—also “two blocks.”

Boat cloak.—A mantle or cloth for the use of officers in a boat.

Break bulk.—To begin to unload.

By the head.—Applied to a vessel or boat when it is deeper in the water forward than aft.

By the stern.—The reverse of “by the head.”

Call.—A pipe or whistle used by the boatswain and his mates, in calling all hands for any purpose, hauling on ropes, belaying, etc., etc. To rouse up.

Canted.—Turned from its square state.

Cast.—To pay a vessel's head off, and bring the wind on

the desired side; to take a sounding, as “get a *cast* of the lead.”

Catch a crab.—Jamming an oar in the row-lock, by catching it in the water while rowing.

Cat's paw.—A light air on the water.

Chock a block.—Full, filled to the extreme limit.

Coaster.—A vessel engaged in running up and down the coast.

Cockbill.—A yard is cockbilled when, by accident or design, one yard-arm is cocked up above the other. An anchor is cockbilled when hanging by the ring stopper only.

Checking lines.—Lines used to haul the light lifts and braces close in to the masts when the yards are sent down; they lead on deck or in the tops.

Check.—To ease off.

Clap on.—To take hold of.

Clap on sail.—To make sail.

Clamp.—To dry down the deck with squillees. To fasten with a clamp.

Call the watch.—To call the watch on deck by the pipe, and passing the word.

Chafe.—To rub and wear.

Clear for running.—A rope so arranged that it can run freely.

Dog-vane.—A small wind vane or pennant placed at the truck, or at some convenient place above the weather rail.

Derrick.—Spar supported by guys. A purchase, for hoisting heavy weights, is made fast to it.

Dismantle.—To unrig a vessel, and discharge all her stores, guns, etc., etc.

Dismasted.—A ship deprived of her masts by accident or design.

Douse.—To let fly, to lower away quickly.

End for end.—To shift one end of a rope to the position occupied by the other end.

Flatten-in-forward.—To haul the head sheets well aft, and amidships.

Flag-ship.—The name applied to the vessel carrying the senior officer's flag.

Forging ahead.—Forced ahead, going ahead slowly.

Fend off.—To bear off, or keep clear of.

Fish a mast or spar.—To secure it with pieces of iron or wood, called fishes.

Full due.—To secure permanently.

Field day.—Day for general cleaning up.

Freshen the nip.—To set up again.

Garland.—A heavy strap, formed by a rope coiled up and marled together; lashed to heavy weights when handling them.

Granny's knot.—A reef or square knot, with the upper turns crossed the wrong way.

Haul.—To pull on; also applied to the wind when working ahead. "The wind hauls ahead."

Holy stone.—A sand stone used in scrubbing decks.

Hand.—To pick up, "to hand a sail."

Holystoning.—Cleaning a deck with holy stone.

Heaver.—A steel spike with a wooden handle, used by sailmakers, to heave in the strands in heavy splicing. A short wooden bar used as a lever.

Heaving down.—Heaving a vessel over on one side, for the purpose of caulking, or repairing her.

Heave to.—To deaden a vessel's headway, by bracing some of the sails aback.

Labor.—To roll and pitch heavily.

Looming.—The appearance of a distant object, “the loom of the land.”

Lend a hand.—To assist, to aid.

Let go by the run.—To let go a rope at once, throwing it clear of the pin or cleat.

Moor a boat.—To anchor her with anchors ahead, or ahead and astern. To secure her to fixed moorings.

Monk bag.—A small purse worn by sailors around the neck.

Nearing the land.—To approach the land.

Off and on.—Coming near the land on one tack, leaving it on the other.

Offing.—Out at sea from the land; well clear of the land.

Overboard.—Outside of the ship.

Overhaul.—To examine, to overtake.

Paddle.—The float of the paddle, or side wheel of a steamer. A short oar.

Pipe down.—A boatswain's call that denotes the end of an evolution, and that people can go below. To stop.

Painter.—A rope in the bows of a boat, by which she is made fast.

Pass.—To hand anything from one to the other.

Passing the word.—Repeating an order or call, so that it may be heard throughout the ship.

Palm and needle.—Sewing utensils used in stitching canvas.

Pricker.—A small steel spike used by sailmakers for making eyelet holes.

Rake.—The fore-and-aft incline of a mast.

Relieving tackles.—Tackles used to assist or take the place of the wheel ropes.

Right.—To rise to an upright position.

Ride.—To be held by the cable.

Round in.—To haul in, "round in the main brace."

Rouse in.—To haul in the slack part of a cable.

Round to.—To come up into the wind when about to anchor—to haul up on either tack.

Roping palm.—A shield for the hand, used when sewing the roping of a sail.

Roping needles.—Used for roping sails, and are from four to twelve thread.

Run down.—One vessel sinking another by running into her.

Rubber.—A flat piece of steel about two inches long, having a wooden handle, used by sailmakers for smoothing seams after sewing.

Screw.—The propeller. A mechanical power for squeezing.

Scotchman.—A piece of iron, with ring attached, seized to the shrouds.

Sheer off.—To shove off, to separate.

Sheers.—Two or more spars, raised at an angle, lashed, and supported by guys, having purchases attached for raising masts and lifting heavy weights.

Span.—A piece of rope or chain made fast at each end, so a purchase may be hooked in the bight.

Squillees.—Wooden clamps holding a piece of rubber, used for drying down decks.

Strike a mast.—To lower it.

Swab.—A mop made of rope or canvas, used for drying down decks, cleaning paint-work, etc., etc.

Swamp.—To sink by filling with water.

Sail hook.—A hook attached to a sailmaker's bench to hold the sail or canvas when sewing.

Seaming palm.—The shield for the hand when seaming a sail.

Seaming needles.—Used when sewing the seams of sails, etc. ; they are from 14 to 17 thread.

Splicing fid.—A hickory marline-spike used by sailmakers.

Stitch mallet.—An eight-square steel instrument, pointed and countersunk in the end, having a wooden handle ; used by sailmakers for heaving in stitching over heavy splices and roping.

Scuttle.—To make holes in a ship's bottom to sink her.

Ship.—To take on board. To enlist to serve on board ship.

Shiver.—To shake the sails.

Slew.—To turn about.

Stand by.—To be ready.

Swing.—A ship turns or swings at her anchor with the tide or wind.

Swing ship.—To get the ship's head on the different points of the compass to determine the deviation.

Slack of a rope.—The part that hangs loose.

Taut.—A corruption of tight.

Tarpaulins.—Painted canvas covers.

Tool bag.—A bag about eight inches in diameter and fourteen inches long, to hold a sailmaker's tools.

Trim.—To arrange a vessel, or yard in the desired positions—as “trim the boat,” etc.

Turn the hands to.—To call “all hands,” and set them at work.

Turnbuckle.—A link, with an adjustable screw, for connecting two parts of a bar or rod together ; used on jacob's ladders, ridge ropes, etc., etc.

Unship.—To take anything from the place to which it is fixed.

Unclamp a boom.—To raise the clamp that holds it down on the yard.

Veer.—To pay out, also applied to the wind, as; “the wind veers aft.”

Veer and haul.—To slack one rope, and haul on another that leads to the same spar, but to another part of it.

Water-logged.—When a vessel is so full of water as to be heavy and unmanageable.

Weather-beaten.—Worn out by exposure to the weather.

Weather gauge.—To windward of; if one ship is to windward of another, she has the weather gauge of her. To get the better of.

Weigh.—To heave an anchor out of the ground.

Wind a boat.—To turn her end for end.

Wind-bound.—Detained by contrary winds.

Wind-fall.—A rush of wind from a high land. A stroke of good luck.

Wind-ride.—When a ship is riding to the wind alone, astern of her anchors.

Wind's eye.—The point from which the wind blows in a direct line.

Water-tanks.—Tanks stowed in the hold, for holding fresh water.

Yaw.—To deviate from a course.

Yellow Jack.—Yellow fever.

DEFINITION OF TIDES.

A windward tide.—When the wind or tide are contrary or opposite.

A leeward tide.—When the wind and tide are together.

A windward ebb.—When the tide is setting out and the wind blowing in.

A windward flood.—When the tide is setting in and the wind blowing out.

A leeward ebb.—When the tide and wind are both setting out.

A leeward flood.—When the wind and tide are both setting in.

A spring tide is the highest tide, and occurs just subsequent to the full and change of the moon.

A neap tide is the lowest tide, occurring when the moon is near the first and third quarters.



(Form No. 26.)

WATCH No.

Y. S. S.

STATION BILLET.

Name,-----; Rate,-----

Division,-----; Gun,-----; Company,-----,

Mess.-----; Armed boat,-----,

Running boat,-----; Fire quarters,-----

EVOLUTION.	STATIONS AND DUTIES.
Loosing sail - - - - -	-----
Furling sail - - - - -	-----
Bending sail - - - - -	-----
Up and down top-gallant and royal yards -	-----
Up and down top-gallant masts - -	-----
House and fid topmasts - - - -	-----
Shifting topsail yards - - - -	-----
Up and down lower yards - - - -	-----
Out and in boats - - - - -	-----
Mooring and unmooring - - - -	-----
Making sail and getting underway - -	-----
Bracing up and setting courses - - -	-----
Tacking and wearing - - - - -	-----
Reefing topsails - - - - -	-----
Shortening sail and coming to anchor -	-----
Clear ship for action - - - - -	-----

You are required to know your stations as shown by this billet, and may be questioned at any time about them. You must keep the billet, but, should you lose it, you must report the fact to the Executive Officer.

U. S. NAVY REGULATIONS.

Commanding Officers, upon returning from a cruise, when directed to discharge the whole or any part of the crew, will forward, immediately on their arrival, to the Secretary of the Navy a list of such of the crew enlisted for three years as, in their opinion, are entitled to honorable discharge, and they are not to be paid off until the discharges and continuous-service certificates have been received from the Bureau and distributed.

When any person, having received an honorable discharge, shall within three months from the date thereof present it at any naval rendezvous, or account for its loss in a satisfactory manner, shall answer to the description it contains, and be found physically fit for the service, he may be re-enlisted for three years; and upon his transfer to a receiving-vessel he will be entitled to three months' gratuitous pay, equal in amount to what he would have been entitled to if he had remained employed in actual service for three months in the rate specified on the face of the honorable discharge.

No person discharged at his own request, or for his own convenience, before the expiration of his term of enlistment, shall be given an honorable discharge.

All men who enlist for three years, except officers' cooks, stewards, and servants, will receive, upon the expiration of their enlistments, if they shall so elect, continuous-service certificates in lieu of the ordinary or honorable discharge; provided they are recommended by their commanding officers as desirable men to be retained in the service.

All persons holding continuous-service certificates will be entitled to receive, for each continuous re-enlistment for three years within three months from the date of their discharge, one dollar per month in addition to the pay prescribed for their several ratings; but a person failing to re-enlist within three months from the date of his discharge will cease to derive any advantage from his previous continuous enlistments.

The continuous-service certificate will embrace all the advantages of an honorable discharge in cases where persons are recommended for the same, and must always show, in the column for the purpose, whether or not the person is entitled to an honorable discharge.

Any enlisted man holding a continuous-service certificate who is distinguished for obedience and sobriety, and is proficient in the line of his duty, shall receive, upon the expiration of his enlistment, a good-conduct badge; after he has received three such badges, under three consecutive re-enlistments within three months from the dates of his discharge, he shall, if qualified, be enlisted as a petty officer, and hold a petty officer's rating during subsequent continuous re-enlistments; and shall not be reduced to a lower rating, except by sentence of a court-martial.

H 131 83
~~H 114 83~~





FEB 83

N. MANCHESTER,
INDIANA 46962



